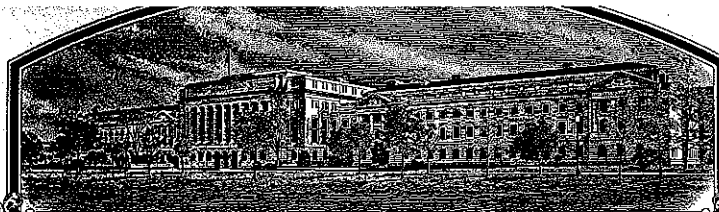


No.

200700177



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Kansas Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE FOREGOING PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMERICAL LIMITATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'Danby'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twenty-third day of May, the year two thousand and seven.

Attest:

Blm Z...

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

W. H. ...

Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER Kansas Agricultural Experiment Station		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME KS02HW34	3. VARIETY NAME Danby
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) Kansas State University Waters Hall Manhattan KS 66506		5. TELEPHONE (include area code) 785.532.6147	FOR OFFICIAL USE ONLY PVPO NUMBER #200700177 FILING DATE MARCH 9, 2007
		6. FAX (include area code) 785.532.6563	
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) University	8. IF INCORPORATED, GIVE STATE OF INCORPORATION	9. DATE OF INCORPORATION	
10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) T. Joe Martin KSU Agricultural Research Center-Hays 1232 240th Avenue Hays KS 67601-9228			FILING AND EXAMINATION FEES: \$ 4,382.00 DATE 3/9/07 CERTIFICATION FEE: \$ 768.00 DATE 4/27/07
11. TELEPHONE (Include area code) 785.625.3425	12. FAX (include area code) 785.623.4369	13. E-MAIL jmartin@ksu.edu	
14. CROP KIND (Common Name) Wheat	16. FAMILY NAME (Botanical) Gramineae	18. DOES THE VARIETY CONTAIN ANY TRANSGENES? (OPTIONAL) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF SO, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERCIALIZATION.	
15. GENUS AND SPECIES NAME OF CROP Triticum aestivum	17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act) <input checked="" type="checkbox"/> YES (If "yes", answer items 21 and 22 below) <input type="checkbox"/> NO (If "no", go to item 23)	
19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Exhibit F. Declaration Regarding Deposit g. <input checked="" type="checkbox"/> Voucher Sample (3,000 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) h. <input checked="" type="checkbox"/> Filing and Examination Fee (\$4,382), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)		21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, WHICH CLASSES? <input checked="" type="checkbox"/> FOUNDATION <input checked="" type="checkbox"/> REGISTERED <input checked="" type="checkbox"/> CERTIFIED	
23. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)		22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.)	
24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)			

25. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER Forrest Chumley by RLB		SIGNATURE OF OWNER	
NAME (Please print or type) Dr. Forrest Chumley		NAME (Please print or type)	
CAPACITY OR TITLE Assoc Director of Research	DATE 3/2/07	CAPACITY OR TITLE	DATE

(See reverse for instructions and information collection burden statement)

GENERAL INSTRUCTIONS: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E, F; (3) for a tuber reproduced variety, verification that a viable (*in the sense that it will reproduce an entire plant*) tissue culture will be deposited and maintained in an approved public repository; and (4) payment by credit card or check drawn on a U.S. bank for \$4,382 (\$518 filing fee and \$3,864 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice). **NEW:** With the application for a seed reproduced variety or by direct deposit soon after filing, the applicant must provide at least 3,000 viable untreated seeds of the variety *per se*, and for a hybrid variety at least 3,000 untreated seeds of each line necessary to reproduce the variety. Partial applications will be held in the PVPO for not more than 90 days; then returned to the applicant as un-filed. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. **Retain one copy for your files.** All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a payment by credit card or check payable to "Treasurer of the United States" in the amount of \$768 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filing a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

Plant Variety Protection Office
Telephone: (301) 504-5518 **FAX:** (301) 504-5291
General E-mail: PVPOmail@usda.gov
Homepage: <http://www.ams.usda.gov/science/pvpo/PVPindex.htm>

SPECIFIC INSTRUCTIONS:

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and **provide evidence** that the permanent name of the application variety (even if it is a parental, inbred line) has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: U.S. Department of Agriculture, Agricultural Marketing Service, Livestock and Seed Programs, **Seed Regulatory and Testing Branch**, 801 Summit Crossing Place, Suite C, Gastonia, North Carolina 28054-2193 Telephone: (704) 810-8870. <http://www.ams.usda.gov/lsg/seed.htm>.

ITEM

- 19a. Give:
- (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
 - (2) the details of subsequent stages of selection and multiplication;
 - (3) evidence of uniformity and stability; and
 - (4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
- (1) identify these varieties and state all differences objectively;
 - (2) attach replicated statistical data for characters expressed numerically and demonstrate that these are clear differences; and
 - (3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
20. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97.103).
23. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
24. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.

22. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)

Summer 2006 sold seed in US

23. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

24. CONTINUED FROM FRONT (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Danby, PVP Application
Exhibit A: Origin and Breeding History of the Variety

Danby was selected from the cross Trego/KS84063-9-39-3-8W which was made in the greenhouse at Hays, KS in the fall of 1995.

Parents:

Trego = Kansas developed hard white winter wheat.

KS84063-9-39-3-8W = A Kansas hard white experimental line that was selected from Jagger, a Kansas developed hard red winter variety. This line would be a sister selection to Betty, a Kansas developed hard white winter variety.

F₁: Grown in the greenhouse at Hays, KS in the fall of 1996. Seed from all plants bulked at harvest. Segregation was not noted among the F₁ plants.

F₂: Grown in the field in 1998 as a F₂ population at Hays and was bulk harvested. The population was segregating for maturity and leaf rust resistance. The only criteria selected for among the populations was the presence of leaf rust resistance.

F₃: Grown in the field in 1999 as a F₃ population. The only selection criteria was the presence of leaf rust resistant plants in the population. Single heads were harvested from the population at physiological maturity (PM). PM was estimated to be when the peduncle just below the head began to lose the green color. These heads were dried at room temperature for 5 days and then frozen until a sprouting test could be completed on the harvested heads. These heads were eventually mounted in perforated trays and placed in a mist chamber where they were kept wet for 7 days at room temperature. Any heads that showed signs of germination were then discarded; heads without signs of germination were dried and threshed to plant as F₄ head rows.

F₄: The head rows were planted in the field at Hays, KS in 2000. Selection criteria used in 2000 were uniformity for maturity, and plant height. Leaf rust resistance, test weight, grain protein content and grain hardness were also used as selection criteria. Six head selections were made from each selected headrow with the remainder of the row bulked.

F₅: The bulk seed from the selected rows were tested in preliminary yield tests at two locations in 2001. The head selections were planted as headrows and grown out at Hays KS and one row was harvested after making 6 additional reselections from the row. Segregation was not observed within the line. Selection criteria included grain yield, test weight, height, maturity, resistance to shattering, stripe rust resistance, leaf rust resistance, soilborne mosaic virus, sprouting tolerance, polyphenol oxidase level, dough mixing strength as measured with a mixograph, and white pan bread baking characteristics.

F₆: In 2002 the bulk was tested in 3 western Kansas preliminary yield tests. The bulk was also grown in a 6 by 30 ft pure seed increase plot at Hays which provided seed for testing in 2003. No segregation was noted in the line. The head selections were grown as head

rows at Hays and a single row was selected from which 6 head selections were made. . Selection criteria included grain yield, test weight, height, maturity, resistance to shattering, tolerance to wheat streak mosaic virus, reaction to soilborne mosaic virus, leaf rust resistance, sprouting tolerance, polyphenol oxidase level, dough mixing strength as measured with a mixograph, and white pan bread baking characteristics.

F₇: Bulk seed from the 2003 pure seed increase plot was used to enter KS02HW34 in replicated yield tests known as the Kansas Intra-State Nursery (KIN). This nursery is a replicated yield test planted at 18 Kansas locations. Two pure seed increase plots were grown at Hays in 2003 with seed produced on the selected headrow. No segregation was observed in the line. Selection criteria included grain yield, test weight from the 9 locations in western Kansas, height, maturity, resistance to shattering, tolerance to wheat streak mosaic virus, stripe rust resistance, leaf rust resistance, lodging resistance, sprouting tolerance, polyphenol oxidase level, dough mixing strength as measured with a mixograph, and white pan bread baking characteristics.

F₈: In 2004 KS02HW34 was tested in the KIN, the Southern Regional Performance nursery and the Kansas Performance Tests With Winter Wheat Varieties. Seed produced in the pure seed increase plots was used to produce a small increase for the variety. No segregation was noted in the increase.

F₉: In 2005 an additional increase was planted at Hays. Segregation was not detected in this grow out. The variety was again tested in all the same nurseries as it was tested in 2004.

F₁₀: In 2006 seed of Danby (KS03HW34) was produced and offered for sale to the public for the first time as class of Certified seed. Segregation was not noted within the variety.

Danby is uniform. Variants are limited to: slightly taller plants that occur at a frequency of less than 1 in 1,000 plants, plants with brown glumes that occur at a frequency of less than 1 in 1,000 plants, and plants that produce seed with a red seed coat that occur at a frequency of less than 1 in 200 plants. The variants in Danby as well as the typical plants in Danby are commercially acceptable.

Danby is stable. When sexually reproduced, the variety remains unchanged in its essential and distinctive characteristics. Danby was observed to be uniform and stable during the last 4 generations.

Danby PVP Application
Exhibit B: Statement of Distinctness

Danby is most similar to Trego.

Danby is different than Trego because Danby has sprouting tolerance equal to that of the red wheat Jagger and Trego is fairly susceptible to sprouting (Table 1& 2).

Danby is also different than Trego because Danby has no resistance to soilborne mosaic virus while Trego is resistant (Table 3&4).

Table 1. % sprout damaged kernels of selected entries of the Kansas Inter-state Nursery (KIN) grown at Garden City KS in 2004.

VARIETY:	AVERAGE % SPROUT:
2137	0.1
Danby	2.1
JAGGER	4.0
NuHills	5.0
TREGO	7.7
LAKIN	8.9
LSD (.05)	2.8
CV	37

Table 2. % germination of seed of three cultivars at various days after test initiation that were grown in the Hays KS KIN in 2003. Seed was harvested at physiological maturity and dried in the lab at room temperature for 5 days and then frozen. The seed was then placed on wet filter paper in a petri dish and placed in a growth chamber at 20 C.

Variety	Day 4	Day 5	Day 6	Day 7	Day 8
TREGO	28 A*	56 A	84 A	92 A	96 A
DANBY	0 B	2 B	7 B	24 B	37 B
JAGGER	0 B	0 B	9 B	23 B	43 B
C. V.	24	31	32	22	19
L. S. D.	4	10	19	18	20

* %GERMINATION IN A COLUMN NOT FOLLOWED BY
THE SAME LETTER ARE SIGNIFICATELY DIFFERENT.

Table 3. Ratings for reaction of wheat lines to soilborne mosaic virus made at various locations of the 2004 Southern Regional Performance Nursery (SRPN).

Wheat soilborne mosaic virus (WSBMV)				
Entry	Line	¹ Stillwater, OK, 3/04/04	¹ Stillwater, OK, 3/10/04	² Urbana, IL
4	Trego	2	1	3.5
47	Danby	4	4	7.5

¹Visual assessment: 1=no mosaic and/or no stunting, 2=slight mosaic and/or slight stunting, 3=moderate mosaic and/or moderate stunting, 4=severe mosaic and/or severe stunting. From Bob Hunger Oklahoma State

²Rated on a scale of 0-9, with 0=resistant, 9=susceptible; from Fred Kolb, University of Illinois.

Table 4. Ratings for reaction of wheat lines to soilborne mosaic virus made at various locations of the 2005 Southern Regional Performance Nursery (SRPN).

2005 SRPN

		SBMV	SBMV
		Urbana, IL (mean, n=2), 1-9, 1=res.	Wichita, KS, 1-9, 1=res.
Entry	Line		
4	Trego	2	2
9	Danby	6	9

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 2.5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

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**U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705**

Exhibit C

**OBJECTIVE DESCRIPTION OF VARIETY
Wheat (*Triticum* spp.)**

NAME OF APPLICANT (S) Kansas Agriculral Exp. Station	TEMPORARY OR EXPERIMENTAL DESIGNATION KS02HW34	VARIETY NAME Danby
ADDRESS (Street and No., or RD No., City, State, Zip Code and Country) Kansas State University Waters Hall Manhattan KS 66506		FOR OFFICIAL USE ONLY PVPO NUMBER #200700177

PLEASE READ ALL INSTRUCTIONS CAREFULLY:

Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g., or) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: RHS. Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

- 1 = Common
2 = Durum
3 = Club
4 = Other (Specify) _____

2. VERNALIZATION:

- 1 = Spring
2 = Winter
3 = Other (Specify) _____

3. COLEOPTILE ANTHOCYANIN:

- 1 = Absent 2 = Present

4. JUVENILE PLANT GROWTH:

- 1 = Prostrate 2 = Semi-Erect 3 = Erect

5. PLANT COLOR: (boot stage)

- 1 = Yellow-Green
2 = Green
3 = Blue-Green

6. FLAG LEAF: (boot stage)

- 1 = Erect 2 = Recurved
 1 = Not Twisted 2 = Twisted
 1 = Wax Absent 2 = Wax Present

7. EAR EMERGENCE:

- Number of Days (Average)
 Number of Days Earlier Than * _____
Same As * Trego
 Number of Days Later Than * _____
*Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial

8. ANTHOR COLOR:

- 1 = Yellow 2 = Purple

9. PLANT HEIGHT: (from soil to top of head, excluding awns)

079

cm (Average)

03

cm Taller Than

Trego

*

Same As

*

cm Shorter Than

*

10. STEM:

A. ANTHOCYANIN

1

1 = Absent 2 = Present

B. WAXY BLOOM

2

1 = Absent 2 = Present

C. HAIRINESS (last internode of rachis)

2

1 = Absent 2 = Present

D. INTERNODE

1

1 = Hollow

2 = Semi-Solid

3 = Solid

5

Number of Nodes

E. PEDUNCLE

1

1 = Erect

2 = Recurved

3 = Semi-Erect

30

cm Length

F. AURICLE

1

Anthocyanin:

1 = Absent

2 = Present

2

Hair:

1 = Absent

2 = Present

11. HEAD: (At Maturity)

A. DENSITY

2

1 = Lax

2 = Middense (Laxidense)

3 = Dense

B. SHAPE

1

1 = Tapering

2 = Strap

3 = Clavate

4 = Other (Specify)

C. CURVATURE

2

1 = Erect

2 = Inclined

3 = Recurved

D. AWNEDNESS

4

1 = Awnless

2 = Apically Awnletted

3 = Awnletted

4 = Awned

12. GLUMES: (At Maturity)

A. COLOR

1

1 = White

2 = Tan

3 = Other (Specify)

B. SHOULDER

5

1 = Wanting

2 = Oblique

3 = Rounded

4 = Square

5 = Elevated

6 = Apiculate

7 = Other (Specify)

C. SHOULDER WIDTH

2

1 = Narrow

2 = Medium

3 = Wide

E. BEAK WIDTH

2

1 = Narrow

2 = Medium

3 = Wide

F. GLUME LENGTH

2

1 = Short (ca. 7 mm)

2 = Medium (ca. 8 mm)

3 = Long (ca. 9 mm)

G. WIDTH

2

1 = Narrow (ca. 3 mm)

2 = Medium (ca. 3.5 mm)

3 = Wide (ca. 4 mm)

D. BEAK

3

1 = Obtuse

2 = Acute

3 = Acuminate

H. PUBESCENCE

2

1 = Not Present

2 = Present

13. SEED:

A. SHAPE

- ☐ 2 1 = Ovate
2 = Oval
3 = Elliptical

B. CHEEK

- ☐ 2 1 = Rounded
2 = Angular

C. BRUSH

- ☐ 2 1 = Short
2 = Medium
3 = Long
- ☐ 1 1 = Not Collared
2 = Collared

D. CREASE

- ☐ 2 1 = Width 60% or less of Kernel
2 = Width 80% or less of Kernel
3 = Width Nearly as Wide as Kernel
- ☐ 3 1 = Depth 20% or less of Kernel
2 = Depth 35% or less of Kernel
3 = Depth 50% or less of Kernel

E. COLOR

- ☐ 1 1 = White
2 = Amber
3 = Red
4 = Other (Specify) _____

F. TEXTURE

- ☐ 1 1 = Hard
2 = Soft
3 = Other (Specify) _____

G. PHENOL REACTION (See Instructions)

- ☐ 3 1 = Ivory
2 = Fawn
3 = Light Brown
4 = Dark Brown
5 = Black

H. SEED WEIGHT

- ☐ 3 ☐ 2 g/1000 Seed (whole number only)

I. GERM SIZE

- ☐ 2 1 = Small
2 = Midsize
3 = Large

14. DISEASE: PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

(0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant)

- | | | | |
|---|-----------|---|---------------------|
| <input type="checkbox"/> 2 Stem Rust (<i>Puccinia graminis</i> f. sp. <i>tritici</i>) | TPMK QTHJ | <input type="checkbox"/> 2 Leaf Rust (<i>Puccinia recondita</i> f. sp. <i>tritici</i>) | CBMT MCDS MBDS MHDS |
| <input type="checkbox"/> 2 TTTT RCRS QFCS RKQQ | | <input type="checkbox"/> 1 MCRK THBJ TNAJ TCTD MFBJ MBBJ | |
| <input type="checkbox"/> 2 Stripe Rust (<i>Puccinia striiformis</i>) | | <input type="checkbox"/> 0 Loose Smut (<i>Ustilago tritici</i>) | |
| <input type="checkbox"/> 1 Tan Spot (<i>Pyrenophora tritici-repentis</i>) | | <input type="checkbox"/> 0 Flag Smut (<i>Urocystis agropyri</i>) | |
| <input type="checkbox"/> 0 Halo Spot (<i>Selenophoma donacis</i>) | | <input type="checkbox"/> 1 Common Bunt (<i>Tilletia tritici</i> or <i>T. laevis</i>) | |
| <input type="checkbox"/> 0 Septoria nodorum (Glume Blotch) | | <input type="checkbox"/> 0 Dwarf Bunt (<i>Tilletia controversa</i>) | |
| <input type="checkbox"/> 0 Septoria avenae (Speckled Leaf Disease) | | <input type="checkbox"/> 0 Karnal Bunt (<i>Tilletia indica</i>) | |
| <input type="checkbox"/> 0 Septoria tritici (Speckled Leaf Blotch) | | <input type="checkbox"/> 1 Powdery Mildew (<i>Erysiphe graminis</i> f. sp. <i>tritici</i>) | |
| <input type="checkbox"/> 1 Scab (<i>Fusarium</i> spp.) | | <input type="checkbox"/> 0 "Snow Molds" | |
| <input type="checkbox"/> 1 "Black Point" (Kernel Smudge) | | <input type="checkbox"/> 0 Common Root Rot (<i>Fusarium</i> , <i>Cochliobolus</i> and <i>Bipolaris</i> spp.) | |
| <input type="checkbox"/> 0 Barley Yellow Dwarf Virus (BYDV) | | <input type="checkbox"/> 0 Rhizoctonia Root Rot (<i>Rhizoctonia solani</i>) | |
| <input type="checkbox"/> 1 Soilborne Mosaic Virus (SBMV) | | <input type="checkbox"/> 0 Black Chaff (<i>Xanthomonas campestris</i> pv. <i>translucens</i>) | |
| <input type="checkbox"/> 0 Wheat Yellow (Spindle Streak) Mosaic Virus | | <input type="checkbox"/> 0 Bacterial Leaf Blight (<i>Pseudomonas syringae</i> pv. <i>syringae</i>) | |
| <input type="checkbox"/> 4 Wheat Streak Mosaic Virus (WSMV) | | <input type="checkbox"/> Other (Specify) _____ | |
| <input type="checkbox"/> Other (Specify) _____ | | <input type="checkbox"/> Other (Specify) _____ | |
| <input type="checkbox"/> Other (Specify) _____ | | <input type="checkbox"/> Other (Specify) _____ | |
| <input type="checkbox"/> Other (Specify) _____ | | <input type="checkbox"/> Other (Specify) _____ | |

15. INSECT: (0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

- | | | |
|--|--------------|--|
| <input type="checkbox"/> 1 Hessian Fly (<i>Mayetiola destructor</i>) | Great Plains | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> 0 Stem Sawfly (<i>Cephus</i> spp.) | | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> 0 Cereal Leaf Beetle (<i>Oulema melanopa</i>) | | <input type="checkbox"/> Other (Specify) _____ |

15. INSECT: (continued) (0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant)

PLEASE SPECIFY BIOTYPE (Where Needed)

<input checked="" type="checkbox"/> 1	Russian Aphid (<i>Diuraphis noxia</i>)	<input type="checkbox"/>	Other (Specify) _____
<input checked="" type="checkbox"/> 1	Greenbug (<i>Schizaphis graminum</i>)	<input type="checkbox"/>	Other (Specify) _____
<input type="checkbox"/> 0	Aphids	<input type="checkbox"/>	Other (Specify) _____

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS:

Danby, PVP Application
Exhibit D: Description

200700177

Danby is a hard white winter wheat selected from the cross Trego/ KS84063-9-39-3-8w. The cross was made during the winter of 1995-96 at the KSU Agricultural Research Center-Hays. The F₁ through F₃ generations were all grown at Hays from 1997 to 1999. In 1999 a single F₃ head was selected and grown at Hays in 2000 as a F₄ headrow. A single head was selected from the F₅ in 2001 and grown as an F₆ headrow in 2002. Seed from the F₆ was subsequently increased as Danby in 2003. The pedigree method of breeding was used.

Danby will be used as a bread wheat and is probably best adapted to dryland production in western Kansas. It has been tested in replicated performance tests in Kansas since 2003. It was tested region wide in the 2004 and 2005 in the Southern Regional Performance Nursery and in the 2004-2006 Kansas Performance Tests with Winter Wheat Varieties. Danby's susceptibility to soilborne mosaic virus will keep it from moving into central Kansas.

Danby is very similar to Trego morphologically. It is a non-shattering semi-dwarf with white chaff. It's plant height and maturity are similar to Trego. Variants found in Danby during its increase are brown chaffed plants that occur at a frequency less than 1 in 1000 plants, slightly taller plants which were found in no more than 1 in 1,000 plants, and plants that produce seed with a red seed coat that occur at a frequency of less than 1 in 200 plants.

Danby was resistant to leaf rust during most of its development but in 2005 when we saw some new races that were virulent to Trego, Danby also became susceptible to leaf rust. Danby is resistant to the prevalent races of stripe rust in the Great Plains. It was resistant in field nurseries in both 2001 and 2003 while Trego was rated susceptible both years. Danby is susceptible to Soilborne mosaic virus (based on field screening nurseries in Kansas and Oklahoma) and Hessian fly (based on USDA screening tests at Manhattan).

Breeder's seed will be maintained by intensely rogueing foundation production fields and by re-purification through head rows at the KSU Agricultural Research Center-Hays. Foundation, Registered, and Certified classes of seed will be recognized. Plant Variety Protection will be applied for and the "Certification Option" elected.

The following is the milling and baking summary for Danby comparing it to the check variety Jagger done by members of the Wheat Quality Council in 2003 and 2004. The Wheat Quality Council is made up of members representing most of the major milling and baking companies in the US.

Description of Test Plots and Breeder Entries

Kansas (Hays) – Joe Martin

The samples submitted were grown in a bottomland site at Hays in 2003. The nursery was not fertilized. Yield levels were high and quite a bit of lodging occurred. Jagger suffered minor yield reductions due to leaf rust and 2137 was affected by both leaf rust and stripe rust.

Jagger (check)

Jagger is included as the check

2137 (check)

2137 is included as the check

KS01HW152-6, KS01HW163-4 and KS02HW34

These lines are all hard white sister lines selected from the cross Trego/Jagger 8W. Jagger 8W was a hard white selection made from Jagger at the same time Betty was selected. These lines have been our top performers in western Kansas dryland nurseries over the last two years. They all have significant improvements over Trego. All are resistant to stripe rust plus KS01HW163-4 and KS02HW34 have an improved level of pre-harvest sprouting tolerance. In our sprouting tests the last two years they have been equal to the red wheat Jagger. In our bread quality tests these lines have been a little variable, in some years we have seen slight improvements in absorption, mixing strength, loaf volume, and crumb grain scores while in other years they have been very similar to Trego. These lines are currently being increased for possible release in 2005

Kansas (Hays): 2003 (Small-Scale) Samples

200700177

Test entry number	03-404	03-405	03-406	03-407	03-408
Sample identification	Jagger (ck)	2137 (ck)	Ks01hw152-6	Ks01hw163-4	ks02hw34
Wheat Data					
FGIS classification	HRW	HRW	HDWH	HDWH	HDWH
Test weight (lb/bu)	54.3	54.1	58.5	60.3	60.4
Hectoliter weight (kg/hl)	71.57	71.32	77.00	79.33	79.46
1000 kernel weight (gm)	23.4	24.8	29.5	30.0	27.3
NIR hardness	54	47	48	48	49
Wheat kernel size (Rotap)					
Over 7 wire (%)	46.6	51.8	67.4	64.2	54.5
Over 9 wire (%)	52.3	47.3	32.5	35.5	44.7
Through 9 wire (%)	1.0	0.9	0.1	0.3	0.7
Single kernel analysis (skcs)					
Hardness/s.d. hardness	68.0/17.9	57.8/17.5	58.4/16.8	57.2/18.3	63.3/16.1
Weight (mg)/s.d. weight	26.5/9.9	27.2/7.9	31.6/9.5	30.1/8.4	29.7/8.9
Diameter (mm)/s.d. diameter	2.11/0.45	2.08/0.44	2.35/0.53	2.22/0.50	2.18/0.50
SKCS distribution	02-11-18-69	08-19-24-49	07-16-26-51	08-14-30-48	02-11-24-63
Classification	Hard	Hard	Hard	Hard	Hard
Wheat moisture (%)	10.4	10.8	10.5	10.9	9.9
Wheat protein (%)*	13.0	10.8	13.2	13.1	12.7
Wheat ash (%)*	1.67	1.67	1.61	1.52	1.53
Milling and Flour Quality Data					
Flour yield (% straight grade)	64.4	69.1	68.1	69.4	68.6
Flour moisture (%)	13.3	12.7	12.9	12.7	13.1
Flour protein (%)*	11.5	9.4	11.3	11.6	11.3
Flour ash (%)*	0.54	0.47	0.42	0.38	0.43
Glutomatic					
Wet gluten (%)	32.4	25.9	33.3	34.3	32.2
Dry gluten (%)	11.4	8.9	11.3	11.9	11.2
Gluten index	98	97	98	97	96
Flour color					
Agtron flour color	70	75	76	74	74
Simon flour color	1.29	-0.07	-0.55	-0.87	-1.35
Falling number (sec)	485	434	462	456	424
Particle size (avg. micron)					
Fisher sub sieve sizer	19.3	19.1	18.0	18.4	19.2

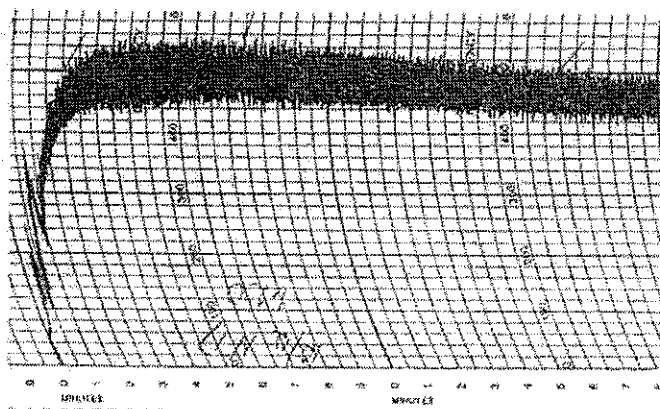
*14% moisture basis; s.d = standard deviation.

200700177

Physical Dough Tests

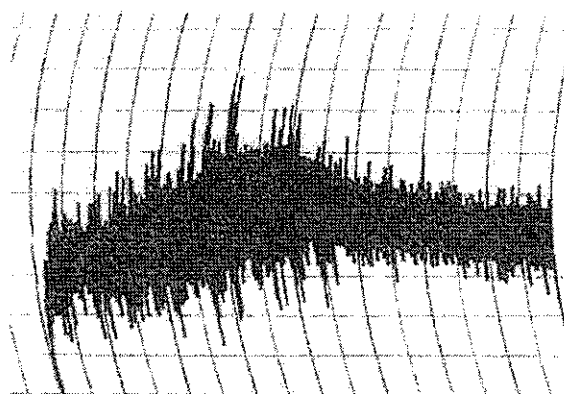
2003 (Small Scale) Samples - Kansas (Hays)

Farinograms



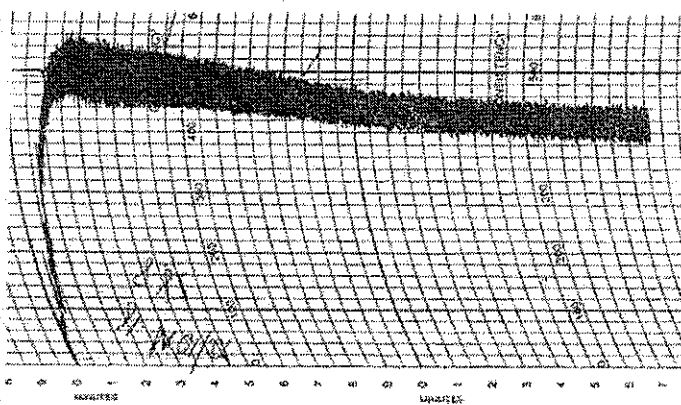
Abs. 61.5%, Peak 7.5 min, Stab. 15.0 min

Mixograms

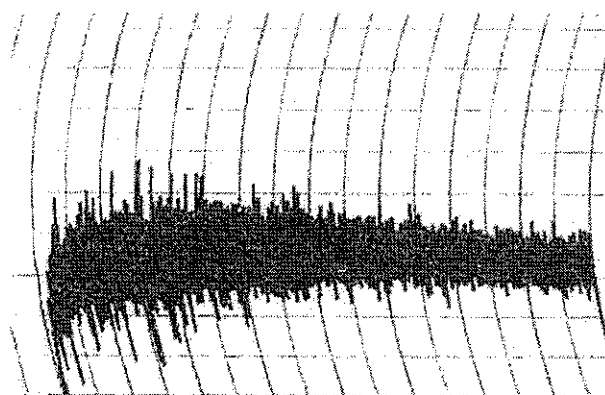


Abs. 64.0%, Mix time 3.9 min

03-404, Jagger (check)



Abs. 57.2%, Peak 4.5 min., Stab. 7.5 min



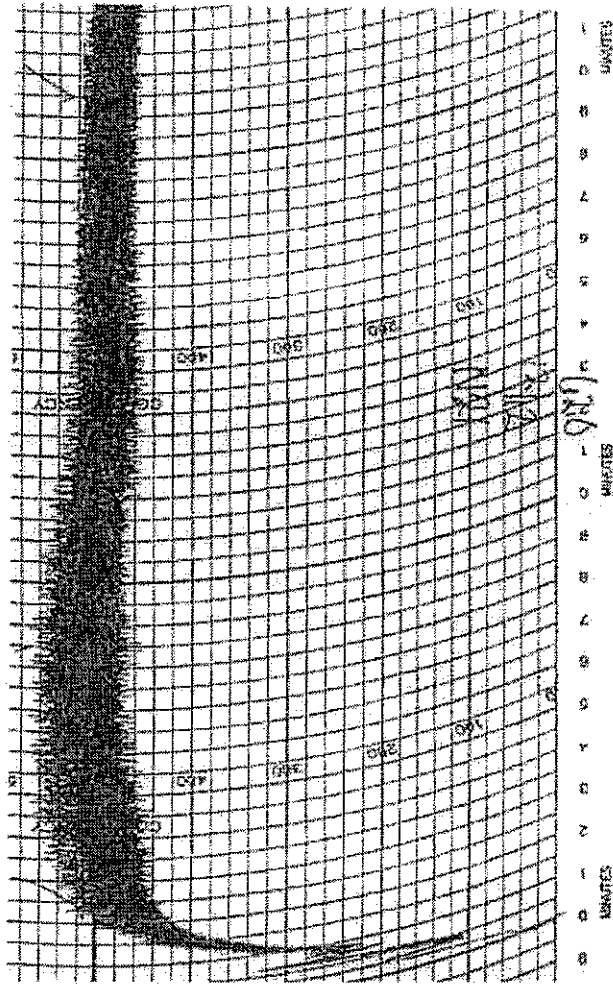
Abs. 57.8%, Mix time 2.6 min

03-405, 2137 (check)

Physical Dough Tests

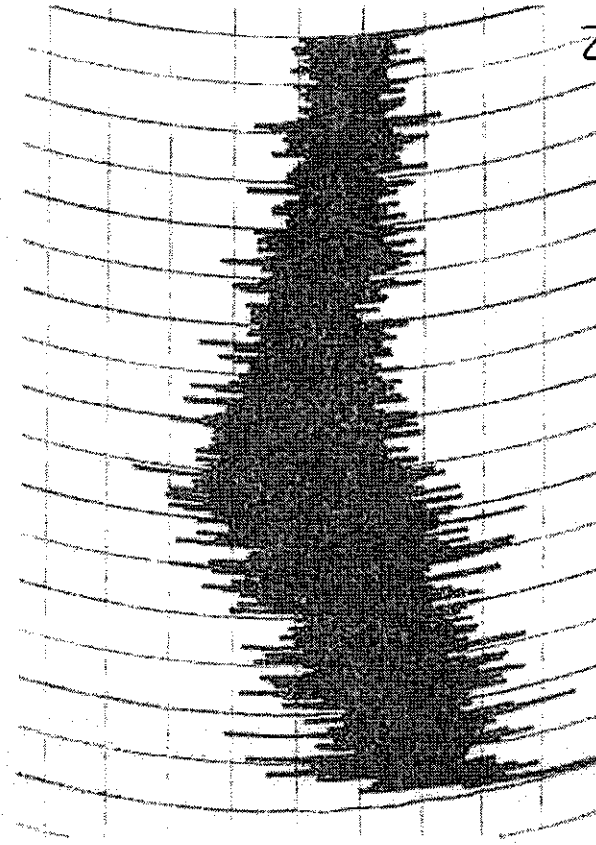
2003 (Small Scale) Samples - Kansas (Hays)

Farinograms



Abs. 61.5%, Peak 8.5 min, Stab. 19.0 min

Mixograms



Abs. 64.0%, Mix time 3.6 min

03-408, KS02HW34

200700177

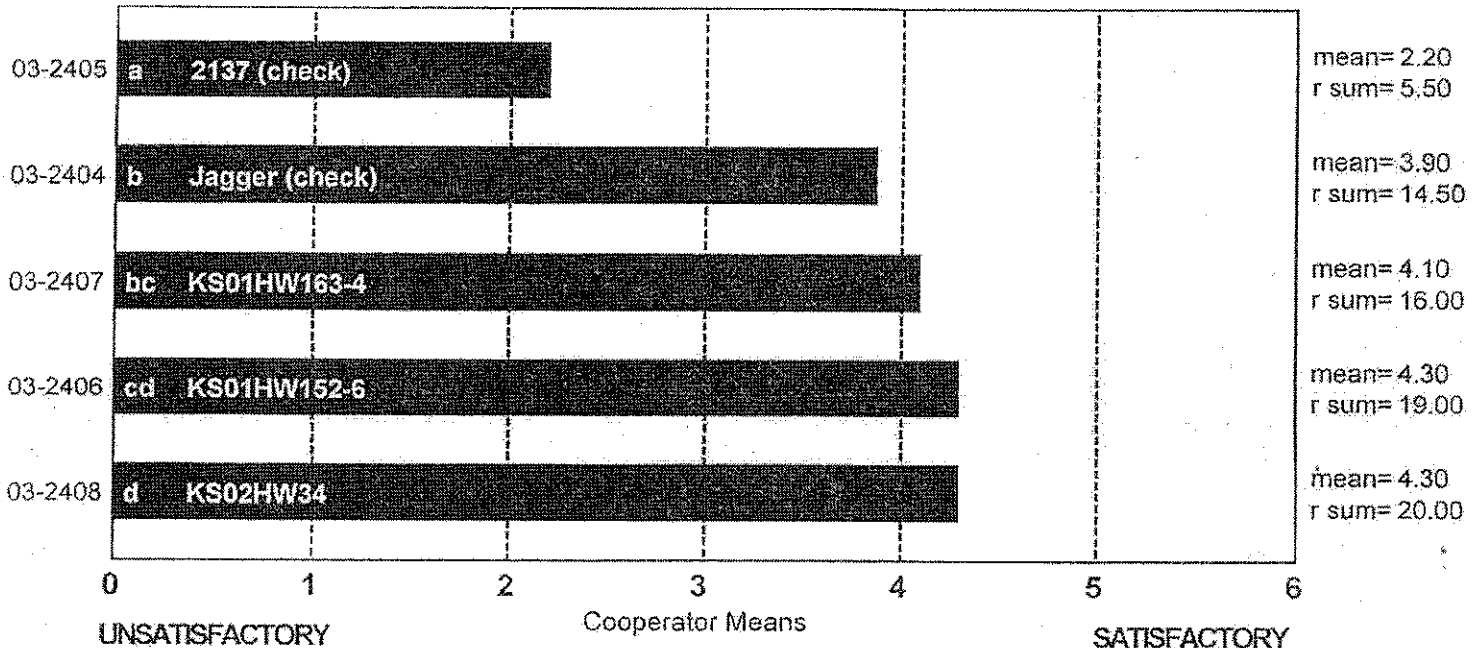
SPONGE CHARACTERISTICS

(Small Scale) Kansas-Hays

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop=5
chisq= 10.60
chisqc= 13.42
cvchisq= 9.49
crdiff= 3.19



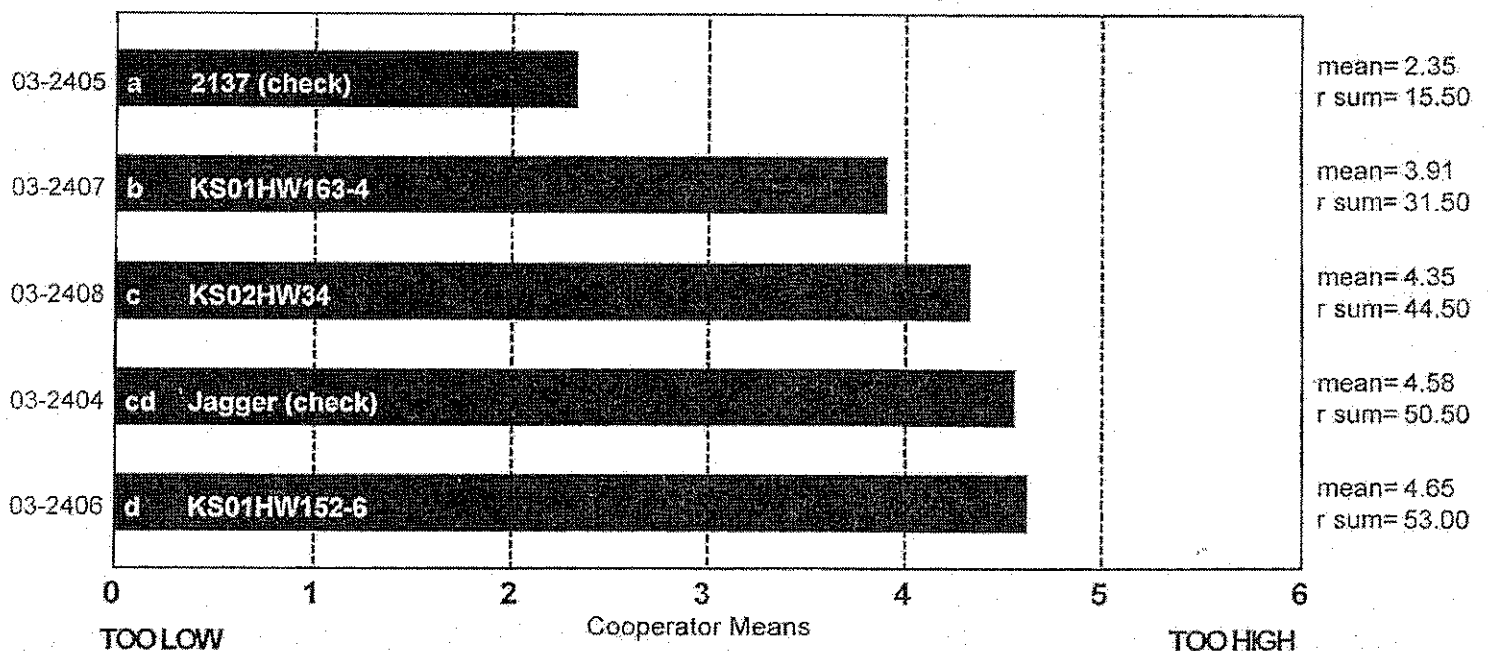
BAKE ABSORPTION

(Small Scale) Kansas-Hays

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop= 13
chisq= 29.75
chisqc= 38.11
cvchisq= 9.49
crdiff= 7.71



BAKE ABSORPTION, ACTUAL (14% MB)

(Small Scale) Kansas-Hays

200700177

	Coop. A	Coop. B	Coop. C	Coop. D	Coop. E	Coop. F	Coop. G	Coop. H	Coop. I	Coop. J	Coop. K	Coop. L	Coop. M
03-2404 Jagger (check)	64.0	61.0	64.0	60.0	60.0	64.0	62.9	64.0	64.5	71.2	63.5	58.0	61.5
03-2405 2137 (check)	58.5	54.8	59.5	59.0	60.0	60.0	58.3	57.0	60.2	69.9	59.2	56.0	60.5
03-2406 KS01HW152-6	64.3	61.3	64.5	61.0	60.0	63.0	63.4	63.0	66.3	71.0	65.3	58.0	62.0
03-2407 KS01HW163-4	62.5	60.2	62.0	59.0	60.0	62.0	62.0	62.0	62.9	70.3	61.9	58.0	60.0
03-2408 KS02HW34	63.2	61.0	64.0	61.0	60.0	63.0	62.7	63.0	64.5	68.7	63.5	57.0	61.5

200700177

BAKE MIX TIME, ACTUAL

(Small Scale) Kansas-Hays

	Coop. A	Coop. B	Coop. C	Coop. D	Coop. E	Coop. F	Coop. G	Coop. H	Coop. I	Coop. J	Coop. K	Coop. L	Coop. M
03-2404 Jagger (check)	3.9	6.0	20.0	20.0	6.0	5.6	4.8	6.0	5.0	3.6	2.5	13.0	3.3
03-2405 2137 (check)	3.5	6.0	6.0	9.0	3.0	6.6	4.4	5.0	3.0	3.3	2.5	14.0	2.8
03-2406 KS01HW152-6	4.0	6.0	12.0	20.0	6.0	5.5	4.3	6.0	4.0	3.9	2.5	13.0	3.3
03-2407 KS01HW163-4	3.3	6.0	15.0	20.0	6.0	5.2	4.4	6.0	5.0	3.2	2.3	12.0	2.8
03-2408 KS02HW34	3.9	6.0	14.0	20.0	9.0	5.6	4.4	6.0	5.0	3.6	2.5	14.0	3.5

Raw Data

200700177

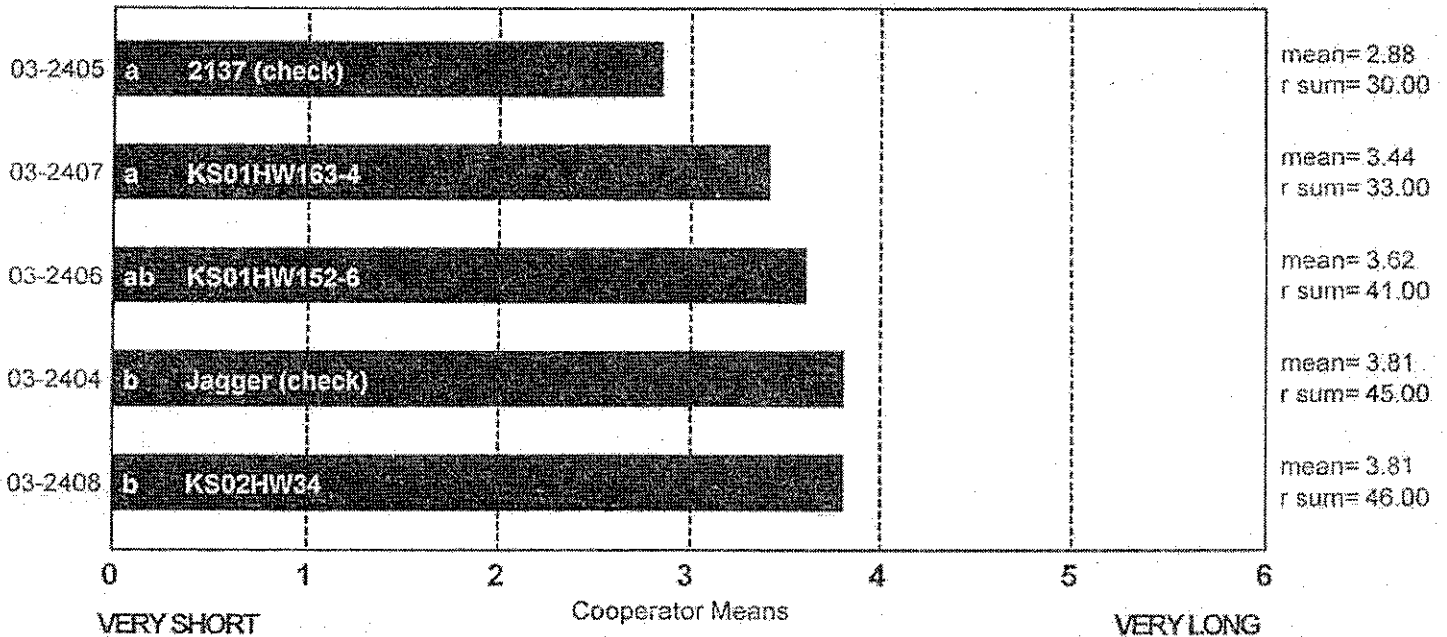
BAKE MIX TIME

(Small Scale) Kansas-Hays

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop= 13
 chisq= 6.34
 chisqc= 10.36
 cvchisq= 9.49
 crdiff= 11.81



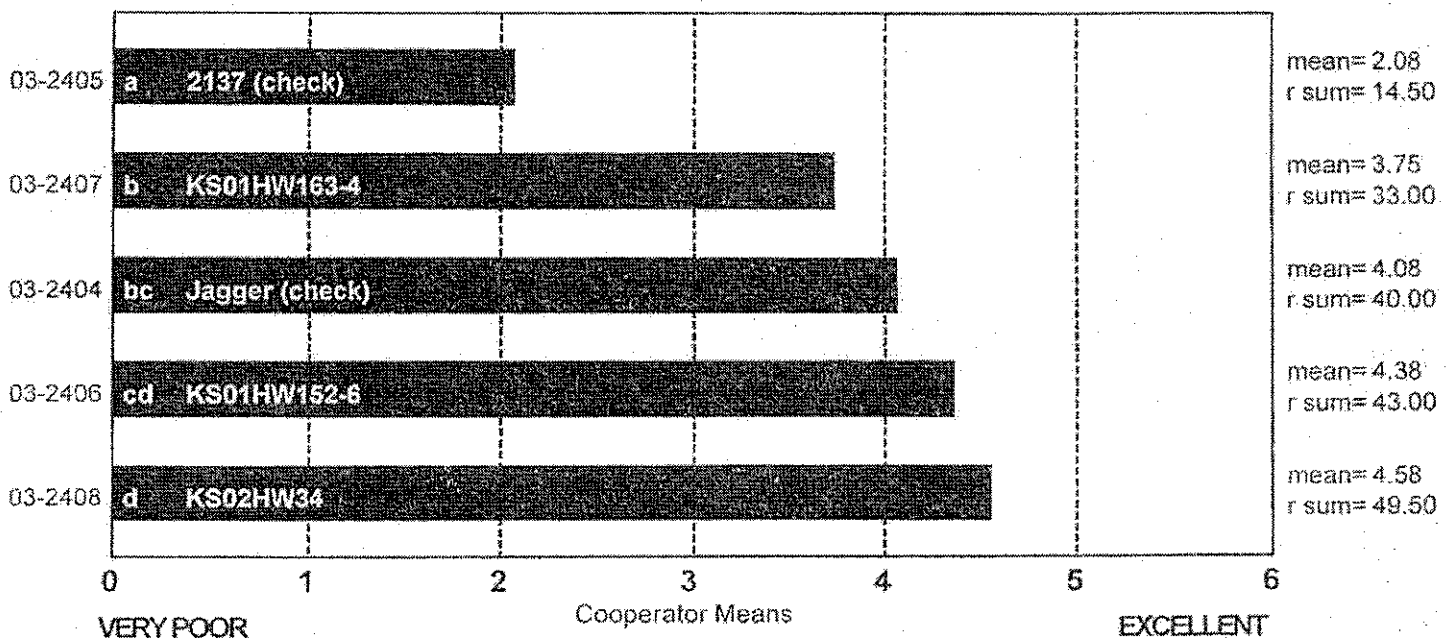
MIXING TOLERANCE

(Small Scale) Kansas-Hays

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop= 12
 chisq= 23.95
 chisqc= 30.25
 cvchisq= 9.49
 crdiff= 8.82



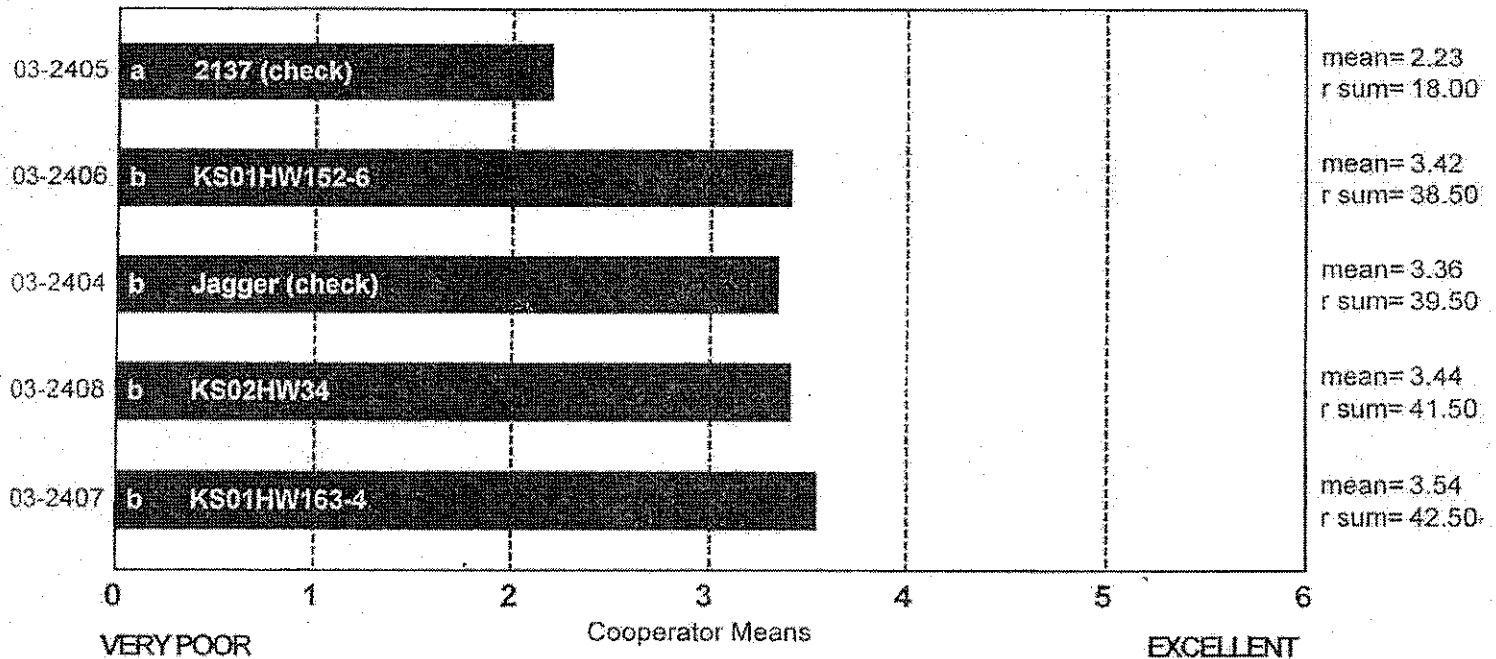
DOUGH CHAR. 'OUT OF MIXER'

(Small Scale) Kansas-Hays

ncoop=12
 chisq=13.83
 chisqc=19.08
 cvchisq=9.49
 crdiff=10.77

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.



DOUGH CHAR. 'OUT OF MIXER', DESCRIBED

(Small Scale) Kansas-Hays

	Sticky	Wet	Tough	Good	Excellent
03-2404 Jagger (check)	2	3	2	5	1
03-2405 2137 (check)	6	0	1	6	0
03-2406 KS01HW152-6	1	2	2	6	2
03-2407 KS01HW163-4	0	2	3	6	2
03-2408 KS02HW34	2	3	2	4	1

Frequency Table

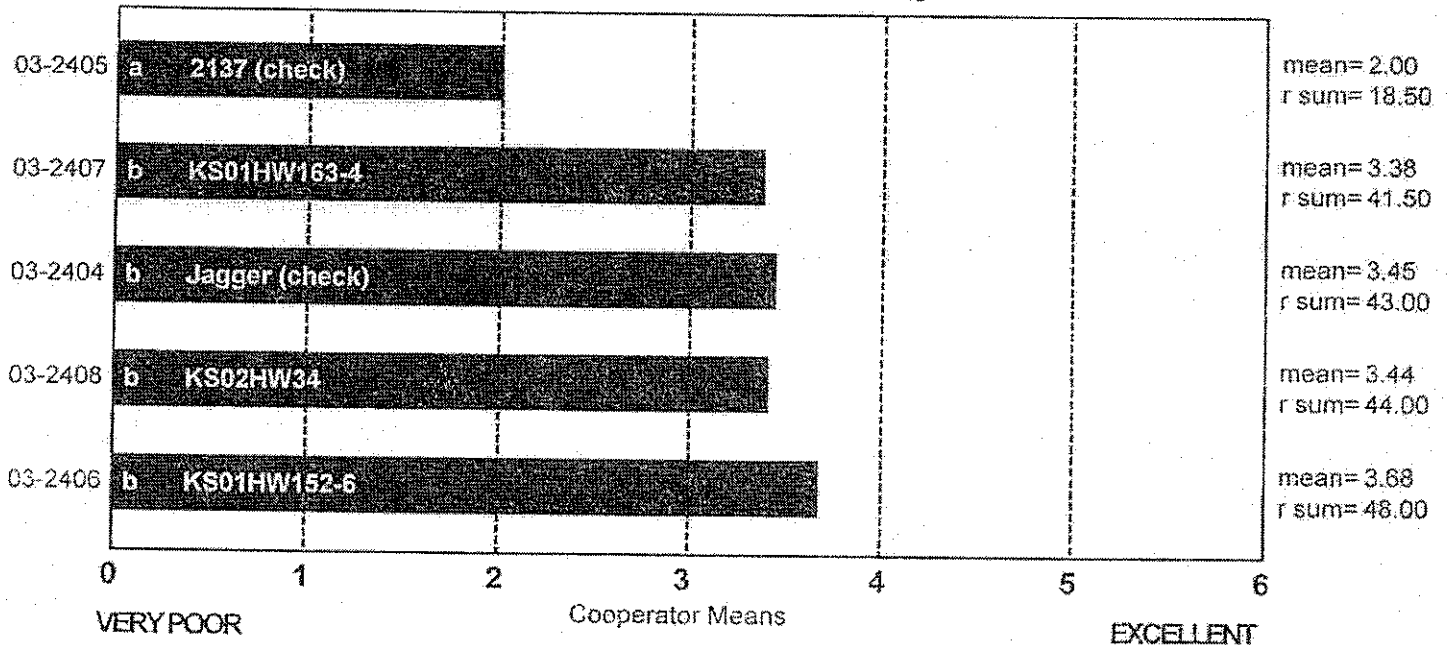
DOUGH CHAR. 'AT MAKE UP'

(Small Scale) Kansas-Hays

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop= 13
chisq= 16.88
chisqc=24.51
cvchisq=9.49
crdiff= 10.18



DOUGH CHAR. 'AT MAKE UP', DESCRIBED

(Small Scale) Kansas-Hays

	Sticky	Wet	Tough	Good	Excellent
03-2404 Jagger (check)	1	1	2	9	0
03-2405 2137 (check)	5	2	2	4	0
03-2406 KS01HW152-6	0	1	1	9	2
03-2407 KS01HW163-4	0	2	1	9	1
03-2408 KS02HW34	0	1	3	6	3

Frequency Table

CRUMB GRAIN

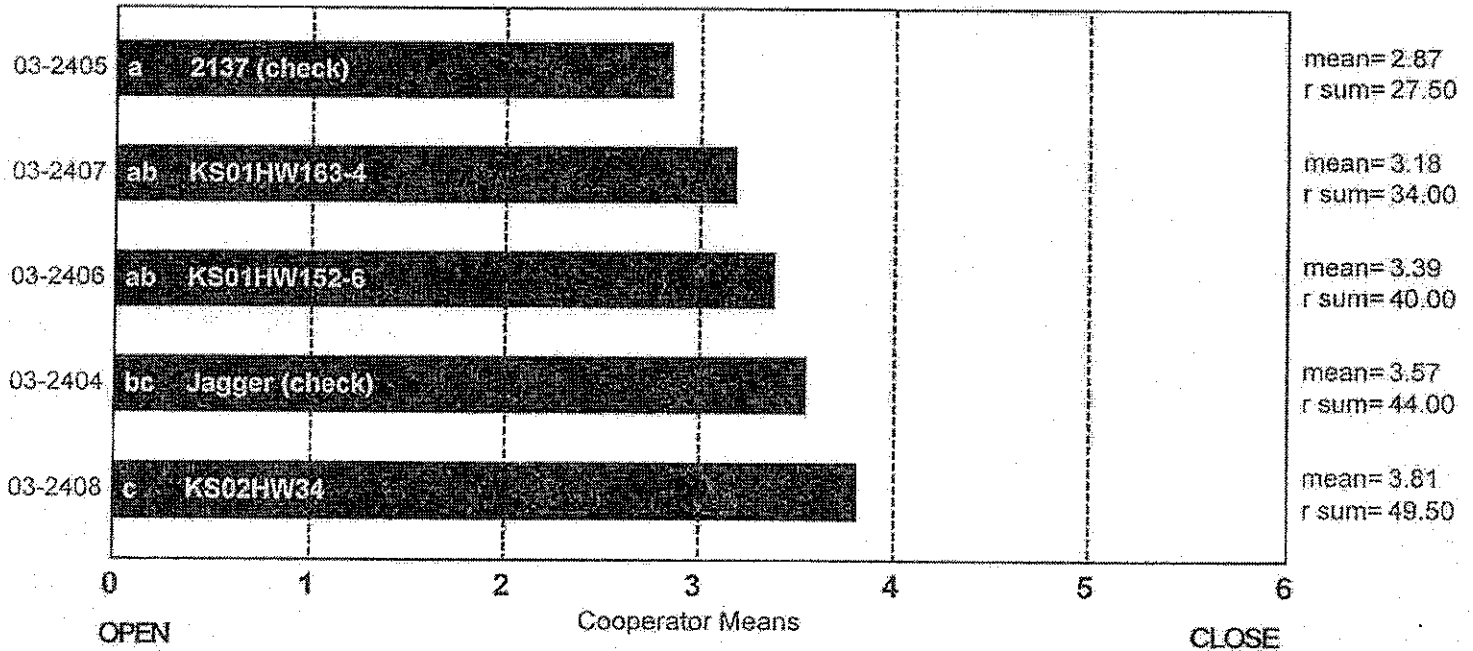
200700177

(Small Scale) Kansas-Hays

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop=13
chisq=9.03
chisqc=11.23
cvchisq=9.49
crdiff=13.40



CRUMB GRAIN, DESCRIBED

(Small Scale) Kansas-Hays

	Open	Dense	Irregular
03-2404 Jagger (check)	5	2	4
03-2405 2137 (check)	6	3	4
03-2406 KS01HW152-6	7	1	4
03-2407 KS01HW163-4	7	2	3
03-2408 KS02HW34	5	1	6

Frequency Table

CELL SHAPE, DESCRIBED

(Small Scale) Kansas-Hays

200700177

	Round	Irregular	Elongated
03-2404 Jagger (check)	4	6	3
03-2405 2137 (check)	4	7	2
03-2406 KS01HW152-6	2	9	2
03-2407 KS01HW163-4	6	5	2
03-2408 KS02HW34	1	7	5

Frequency Table

CELL THICKNESS, DESCRIBED

(Small Scale) Kansas-Hays

	Too Thin	Too Thick	Variable	Broken	Acceptable
03-2404 Jagger (check)	0	3	4	0	5
03-2405 2137 (check)	1	4	5	0	2
03-2406 KS01HW152-6	0	3	5	0	4
03-2407 KS01HW163-4	0	0	8	0	4
03-2408 KS02HW34	0	0	4	0	8

Frequency Table

CRUMB TEXTURE

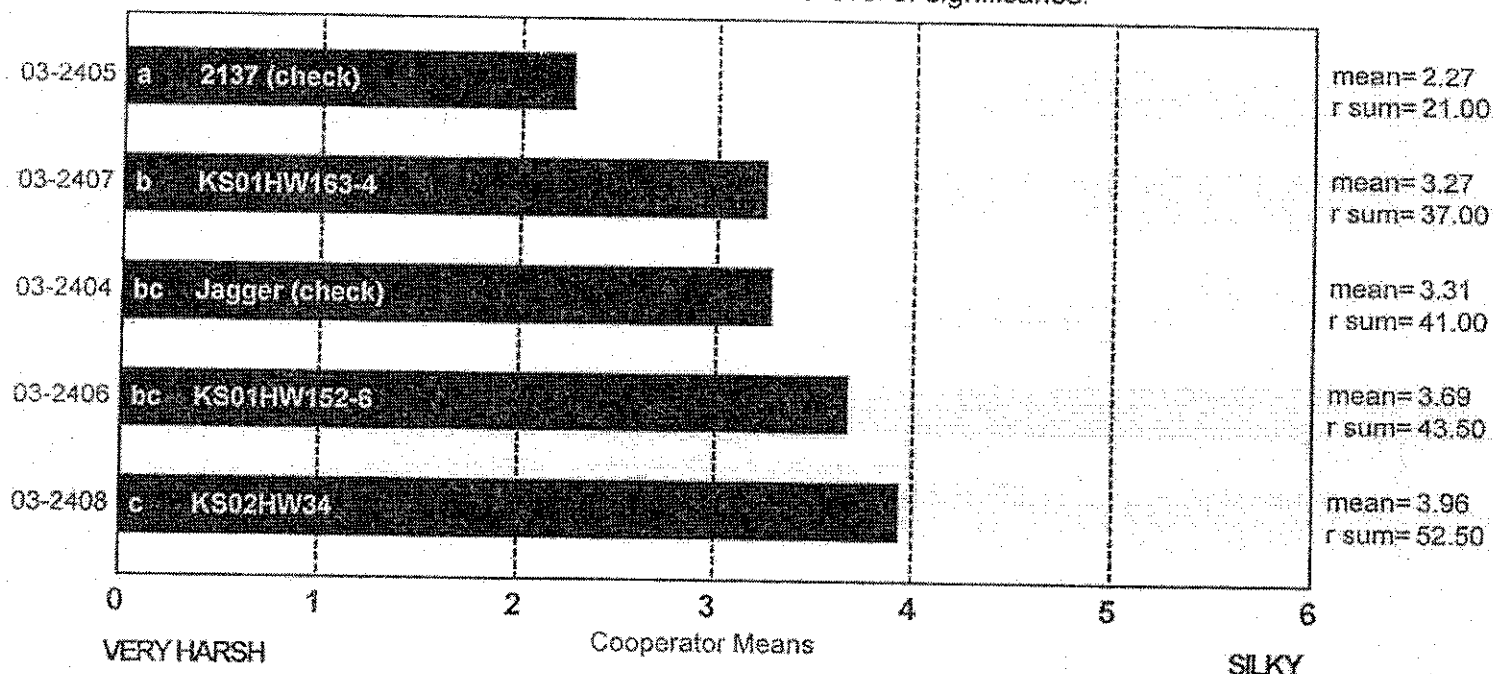
(Small Scale) Kansas-Hays

200700177

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop= 13
chisq= 16.45
chisqc= 20.46
cvchisq= 9.49
crdiff= 11.78



CRUMB TEXTURE, DESCRIBED

(Small Scale) Kansas-Hays

	Coarse	Harsh	Silky
03-2404 Jagger (check)	3	5	5
03-2405 2137 (check)	5	6	2
03-2406 KS01HW152-6	3	3	6
03-2407 KS01HW163-4	3	4	5
03-2408 KS02HW34	2	1	9

Frequency Table

CRUMB COLOR

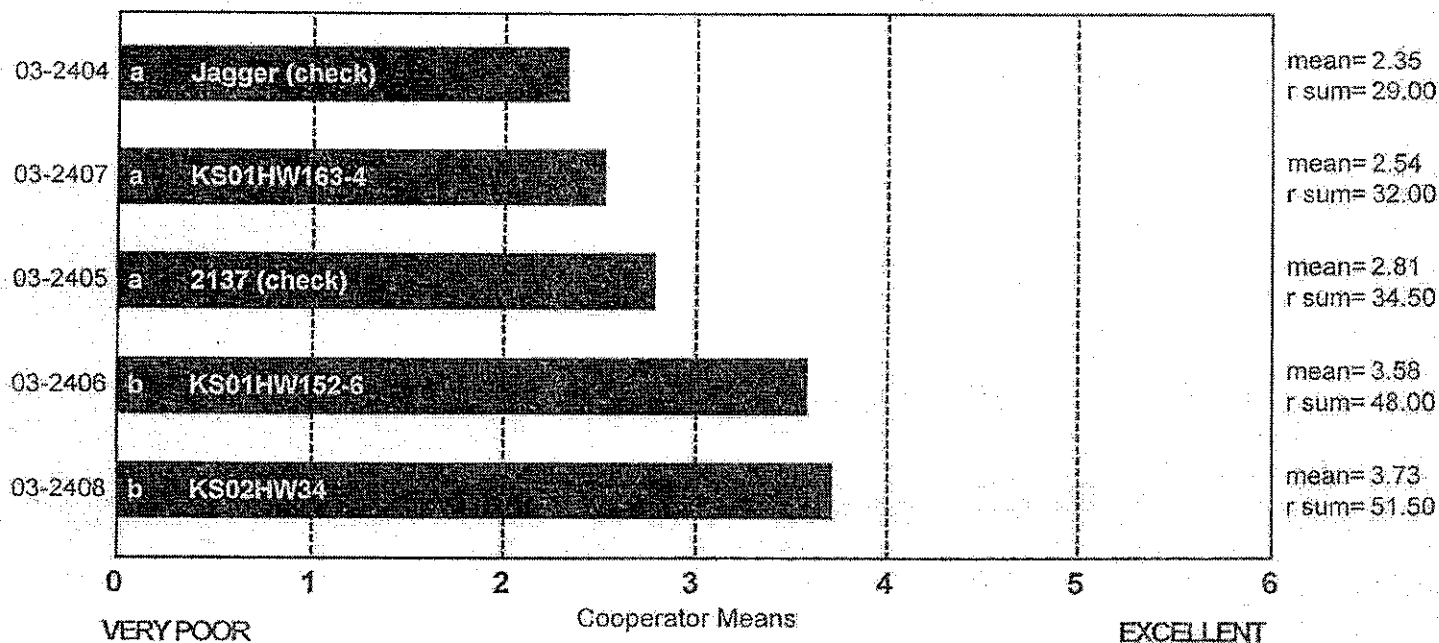
(Small Scale) Kansas-Hays

200700177

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop=13
chisq=12.51
chisqc=19.47
cvchisq=9.49
crdiff=10.70



CRUMB COLOR, DESCRIBED

(Small Scale) Kansas-Hays

	Yellow	Gray	Dull	Creamy	Bright White
03-2404 Jagger (check)	6	0	3	4	0
03-2405 2137 (check)	2	0	7	4	0
03-2406 KS01HW152-6	2	0	2	7	2
03-2407 KS01HW163-4	4	1	3	5	0
03-2408 KS02HW34	1	0	1	10	1

Frequency Table

LOAF WEIGHT, ACTUAL

(Small Scale) Kansas-Hays

	Coop.	Coop.	Coop.	Coop.	Coop.	Coop.	Coop.	Coop.	Coop.	Coop.	Coop.	Coop.	Coop.	Coop.	Coop.
	A	B	C	D	E	F	G	H	I	J	K	L	M		
03-2404 Jagger (check)	143.7	500.0			135.0	140.6	149.5	463.5	419.1	156.1	131.4	430.0	143.0		
03-2405 2137 (check)	141.0	500.0			135.0	137.8	146.6	464.4	418.7	160.3	130.7	429.0	144.0		
03-2406 KS01HW152-6	143.4	500.0			135.0	138.9	150.5	464.8	417.5	159.6	133.5	426.0	143.9		
03-2407 KS01HW163-4	142.6	490.0			134.0	138.9	149.5	463.3	418.1	156.8	130.3	428.0	139.9		
03-2408 KS02HW34	142.6	500.0			135.0	138.0	149.5	460.6	414.7	154.8	130.7	430.0	140.0		

200700177

LOAF VOLUME, ACTUAL

(Small Scale) Kansas-Hays

	Coop. A	Coop. B	Coop. C	Coop. D	Coop. E	Coop. F	Coop. G	Coop. H	Coop. I	Coop. J	Coop. K	Coop. L	Coop. M
03-2404 Jagger (check)	870	2800	2700	2956	922	870	873	2525	2326	890	800	2800	800
03-2405 2137 (check)	740	2600	2500	2868	795	665	750	2413	2360	785	725	2675	645
03-2406 KS01HW152-6	880	2900	2650	2897	875	840	863	2488	2216	900	920	2700	780
03-2407 KS01HW163-4	845	2600	2725	2750	918	835	835	2538	2363	925	880	2800	820
03-2408 KS02HW34	935	2950	2775	2927	948	890	900	2588	2440	920	955	2700	875

200700177

LOAF VOLUME

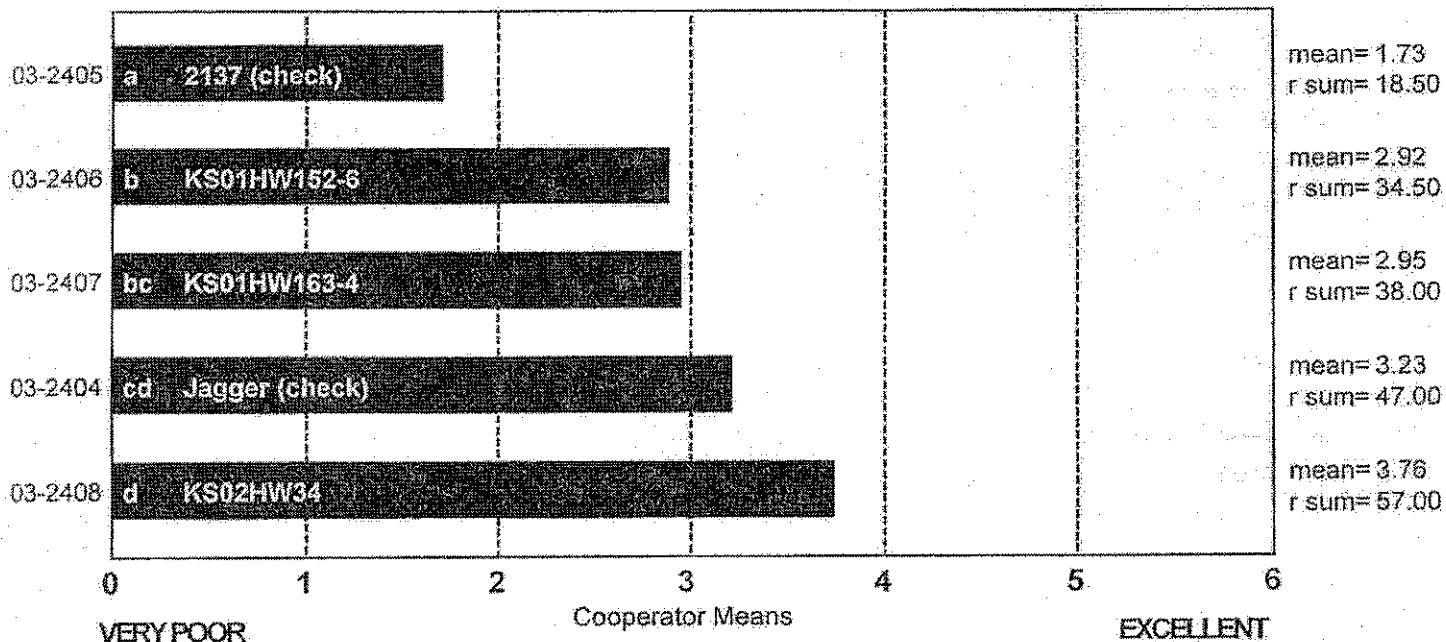
(Small Scale) Kansas-Hays

200700177

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop= 13
chisq= 25.52
chisqc= 28.98
cvchisq= 9.49
crdiff= 10.54



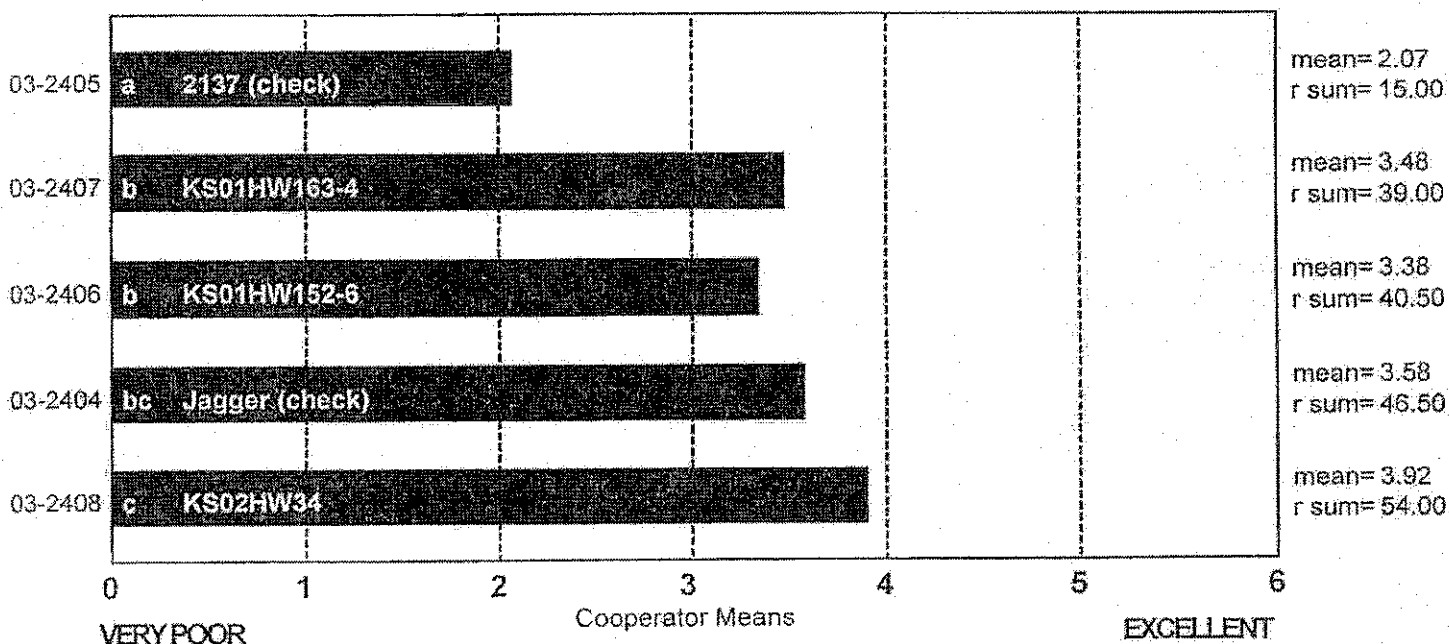
OVERALL BAKING QUALITY

(Small Scale) Kansas-Hays

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop= 13
chisq= 26.45
chisqc= 28.18
cvchisq= 9.49
crdiff= 11.06



200700177

COOPERATOR'S COMMENTS

(Small Scale) Kansas-Hays

03-404 Jaggger(check)

- A. Good absorption, sticky out of mixer
- B. Specky
- C. Very specky flour, high ash*
- D. Very strong dough, open, slightly round, harsh texture, good volume*
- E. Good performance overall, very specky*
- F. Excellent out of the mixer, close/elongated grain, silky texture
- G. Bran in flour, good absorption and mixing time, but questionable crumb, yellow crumb
- H. High absorption, silky texture, yellow crumb, slightly low volume-acceptable*
- I. No comments*
- J. No comments
- K. Good absorption-loaf volume low-yellow crumb
- L. Better than 2405*
- M. No comments

03-405 2137(check)

- A. Very low absorption, poor tolerance, wet at make-up, low loaf volume
- B. Bran specks
- C. Very specky flour, high ash, insufficient/flat/ragged break and shred*
- D. Poor mixing strength, low absorption, open, irregular, coarse grain*
- E. Very poor tolerance, low volume, putty dough, specky*
- F. Low protein, very low loaf volume, harsh texture
- G. Bran in flour, poor absorption, low loaf volume, questionable crumb but good mixing time, creamy crumb
- H. Very low absorption, poor mixing tolerance, sticky doughs, open grain, harsh texture, low volume-unacceptable*
- I. No comments*
- J. Good loaf volume for protein level
- K. Low absorption, poor loaf volume, poor crumb color
- L. Sticky, putty like and weak*
- M. No comments

- A. Average absorption and mixing time, poor crumb grain-open, good loaf volume
- B. Strong
- C. Slightly ragged uneven break and shred*
- D. Good strength, smooth grain, average volume*
- E. Lively dough, longer mix tolerance, slightly open grain, good texture*
- F. Wet out of the mixer, coarse texture, better than average loaf volume of this group
- G. Good medium mixing time, excellent at make-up, silky texture, good loaf volume, good crumb
- H. Good absorption, average scores in most categories-acceptable*
- I. No comments*
- J. Good loaf volume for protein level
- K. Absorption good, high mix tolerance, good color and grain/texture scores, good loaf volume
- L. Equal go Jagger*
- M. No comments

*C, D, E, H, I, and L comments for sponge and dough bake test.

200700177

Description of Test Plots and Breeder Entries

KANSAS-Hays - Joe Martin

The samples submitted were grown at a bottomland site at Hays in 2004. The nursery was not fertilized. Yield levels were good in spite of the drought stress in early spring. Diseases or insects were not a problem however the samples were rained on prior to harvest and some sprout damage was noticed.

Jagger (check)

2137 (check)

KS02HW34 and KS02HW35

These lines are hard white sister lines selected from the cross Trego/Jagger 8W. Jagger 8W was a hard white selection made from Jagger at the same time Betty was selected. These lines have been our top performers in western Kansas dryland nurseries over the last three years. They both have significant improvements over Trego. Both are resistant to stripe rust and leaf rust. They also have an improved level of pre-harvest sprouting tolerance. In our sprouting tests the last three years they have been equal to the red wheat Jagger. KS02HW34 was tested in the 2003 by the Wheat Quality Council and has been approved for possible release to seed producers in 2005.

KS03HW158

This line is a hard white selection from the cross Trego/CO960293. It is basically a Trego type wheat which carries the resistance to wheat streak mosaic virus from CO960293. KS03HW158 has had improved mixing strength and absorption relative to Trego in the Wheat Quality Labs bake tests at KSU. The earliest this line could be released would be 2006.

200700177

KANSAS-Hays: 2004 (Small-Scale) Samples^a

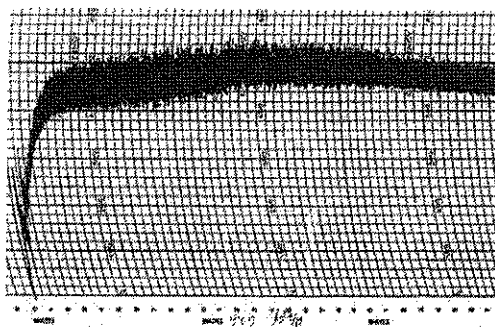
Test entry number	04-2401	04-2402	04-2403	04-2404	04-2405
Sample identification	Jagger (check)	2137 (check)	KS02HW34	KS02HW35-5	KS03HW158
Wheat Data					
FGIS classification	HRW ?	HRW	HDWH	HDWH	HDWH
Test weight (lb/bu)	56.8	57.4	60.8	61.1	60.4
Hectoliter weight (kg/hl)	74.8	75.6	80.0	80.4	79.5
1000 kernel weight (gm)	27.8	31.2	29.3	33.0	33.2
NIR hardness	58.0	53.0	57.0	65.0	71.0
Wheat kernel size test (Rotap)					
Over 7 wire (%)	59.5	66.8	59.4	76.1	82.1
Over 9 wire (%)	40.3	33.1	40.6	23.9	17.9
Through 9 wire (%)	0.2	0.1	0.0	0.0	0.1
Single kernel analysis (skcs)					
Hardness/s.d. hardness	66.0/15.0	51.0/14.0	63.0/14.0	70.0/14.0	64.0/17.0
Weight (mg)/s.d. weight	31.0/9.9	32.3/7.9	31.3/7.6	33.2/7.7	34.8/8.7
Diameter (mm)/s.d. diameter	2.39/0.51	2.37/0.42	2.35/0.41	2.46/0.44	2.57/0.53
SKCS distribution	02-04-20-74	10-29-34-27	03-08-27-62	01-02-17-80	04-15-15-66
Classification	Hard	Hard	Hard	Hard	Hard
Wheat moisture (%)	10.0	10.1	10.2	10.2	10.2
Wheat protein (12% mb)	15.0	14.0	14.0	14.2	14.3
Wheat ash (12% mb)	1.45	1.40	1.27	1.28	1.33
Milling and Flour Quality Data					
Flour yield (% str. grade)	75.0	72.7	74.4	74.2	73.2
Flour moisture (%)	12.9	12.8	12.6	12.6	11.5
Flour protein (14% mb)	14.0	12.2	12.4	12.4	12.6
Flour ash (14% mb)	0.36	0.34	0.31	0.32	0.30
Glutomatic					
Wet gluten (%)	37.0	34.4	36.6	35.4	34.8
Dry gluten (%)	13.4	12.4	12.5	12.4	12.3
Gluten index	99	97	90	97	97
Flour color					
Agtron flour color	72	77	76	74	74
Simon/Kent-Jones flour color	0.76	-1.56	2.46	-0.98	-1.37
Minolta Color Meter					
L*	91.08	92.10	92.0	91.51	91.59
a*	-1.35	-1.37	-1.39	-1.43	-1.68
b*	8.49	6.83	7.21	7.29	8.47
Falling number (sec)	511	500	407	419	283
Flour particle size (avg. μ)					
Fisher sub sieve sizer	19.0	17.5	19.0	20.0	20.0

^a s.d. = standard deviation; skcs = Single Kernel Characterization System 4100.

200700177

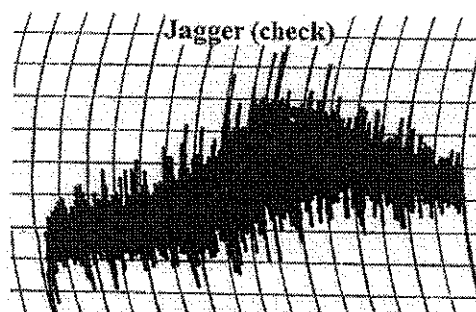
Physical Dough Tests 2004 (Small Scale) KANSAS-Hays

Farinograms



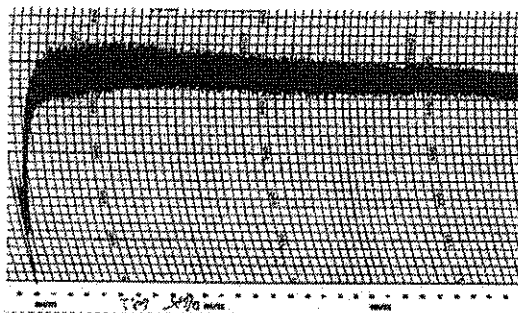
Abs. 61.8%, Peak 16.3 min, Stab. 16.6 min

Mixograms

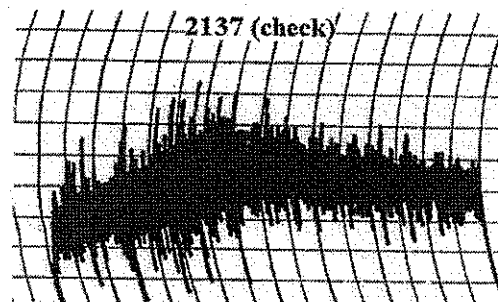


Abs. 64.6%, Mix time 4.6 min

04-2401, Jagger (check)



Abs. 61.8%, Peak 11.0 min, Stab. 27.6 min



Abs. 62.1% Mix Time 3.4 min

04-2402, 2137 (check)

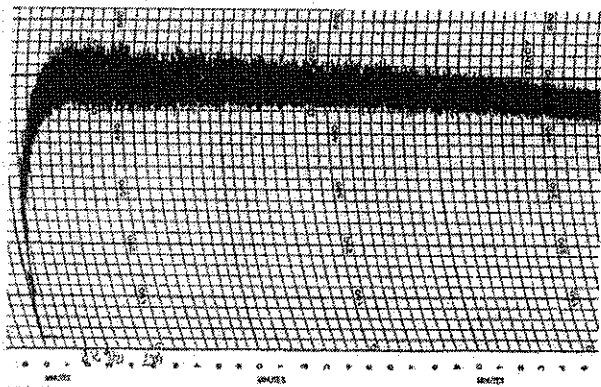
200700177

Physical Dough Tests

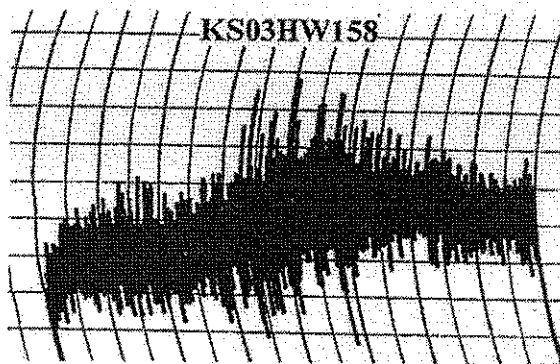
2004 (Small Scale) KANSAS-Hays (continued)

Farinograms

Mixograms



Abs. 58.7%, Peak 13.7 min, Stab. 24.5 min



Abs. 61.4%, Mix time 4.8 min

04-2405. KS03HW158

200700177

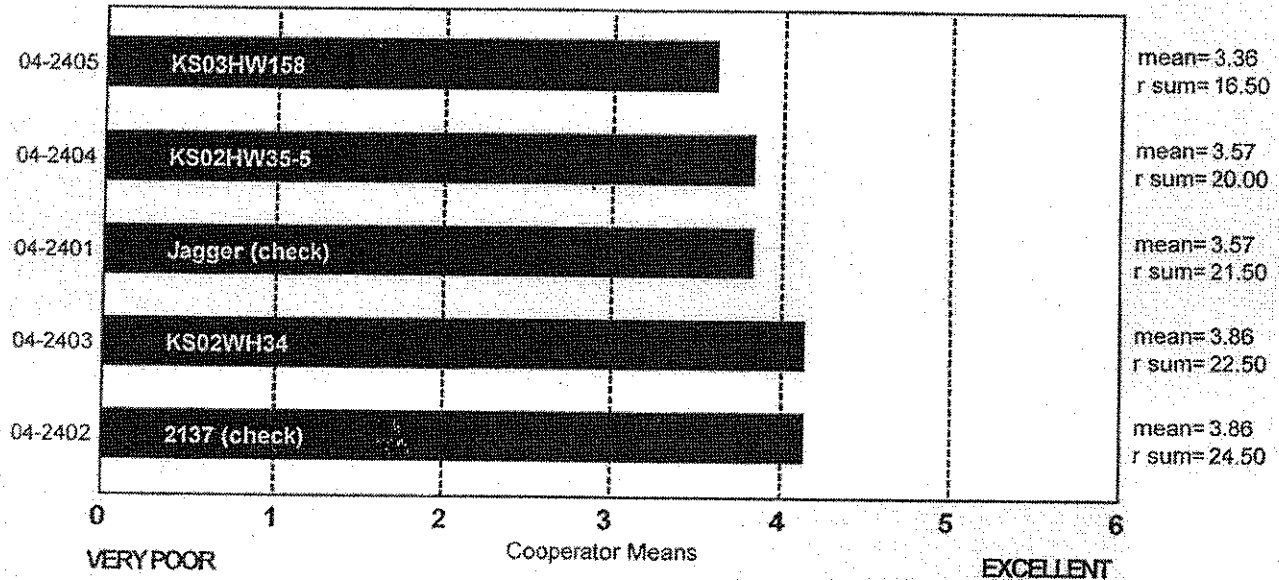
SPONGE CHARACTERISTICS

(Small Scale) Kansas-Hays

Variety order by rank sum.

No samples different at 5.0% level of significance.

ncoop=7
chisq=2.06
chisqc=-4.97
cvchisq=9.49
crdiff=



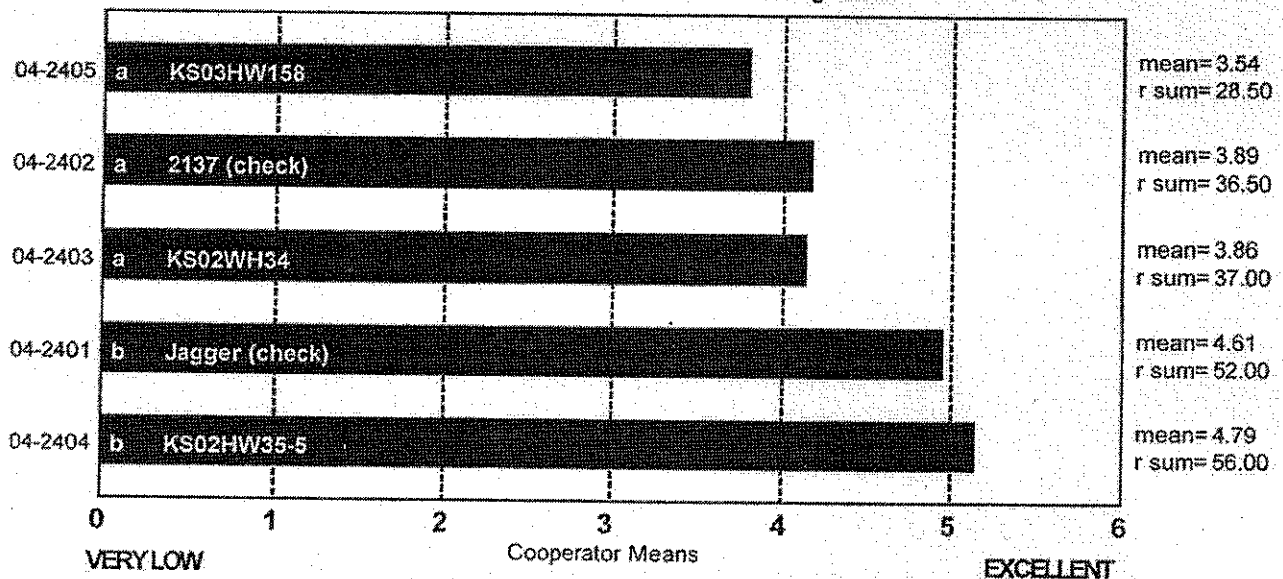
BAKE ABSORPTION

(Small Scale) Kansas-Hays

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop=14
chisq=15.24
chisqc=22.58
cvchisq=9.49
crdiff=11.06



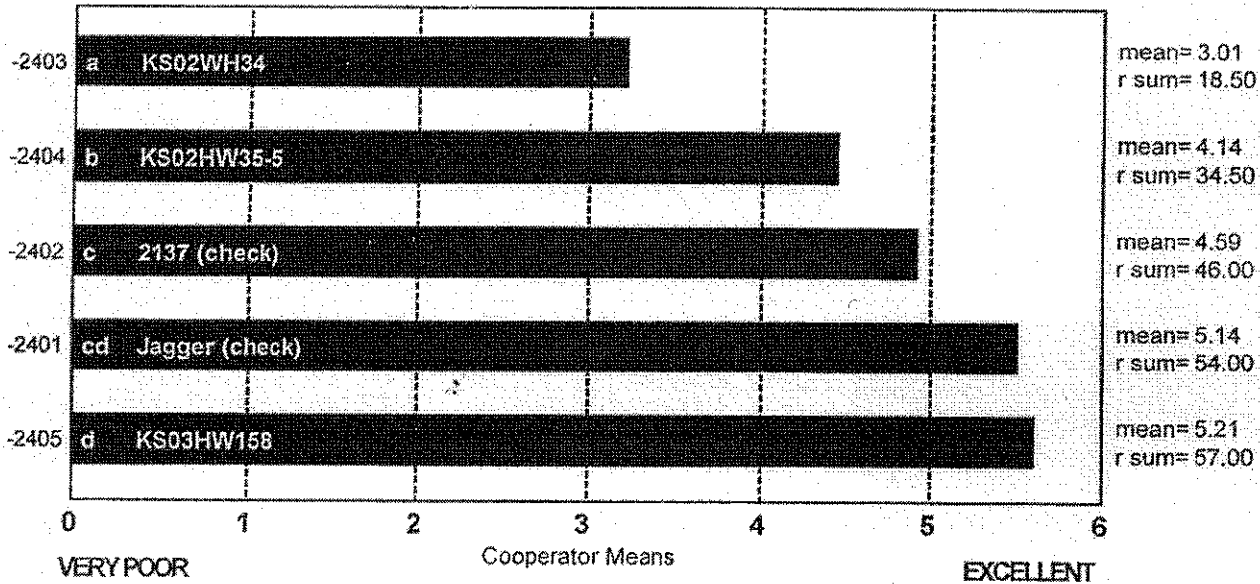
200700177

BAKE MIX TIME (Small Scale) Kansas-Hays

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop= 14
chisq= 28.39
chisqc= 32.44
cvchisq= 9.49
crdiff= 10.57

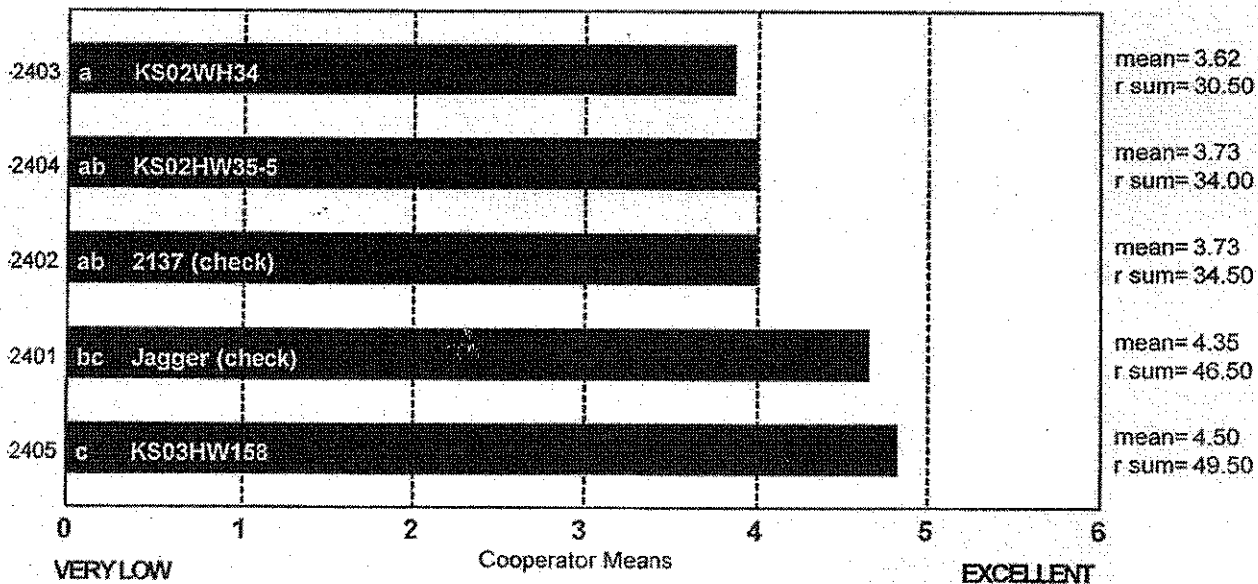


MIX TOLERANCE (Small Scale) Kansas-Hays

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop= 13
chisq= 8.74
chisqc= 11.36
cvchisq= 9.49
crdiff= 13.08



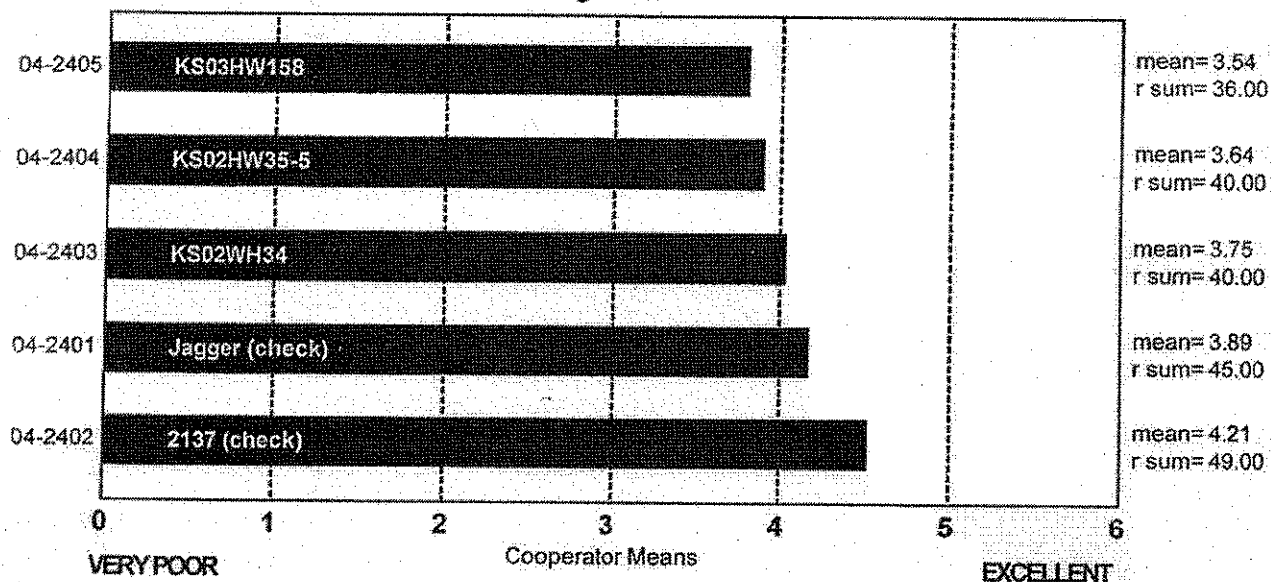
36

200700177

DOUGH CHAR. 'OUT OF MIXER' (Small Scale) Kansas-Hays

Variety order by rank sum.
No samples different at 5.0% level of significance.

ncoop= 14
chisq=2.91
chisqc=3.74
cvchisq=9.49
crdiff=



DOUGH CHAR. 'OUT OF MIXER', DESCRIBED (Small Scale) Kansas-Hays

	Sticky	Wet	Tough	Good	Excellent
04-2401 Jagger (check)	0	0	6	6	2
04-2402 2137 (check)	0	0	4	7	3
04-2403 KS02WH34	2	0	1	11	0
04-2404 KS02HW35-5	0	0	3	11	0
04-2405 KS03HW158	0	0	5	7	2

Frequency Table

200700177

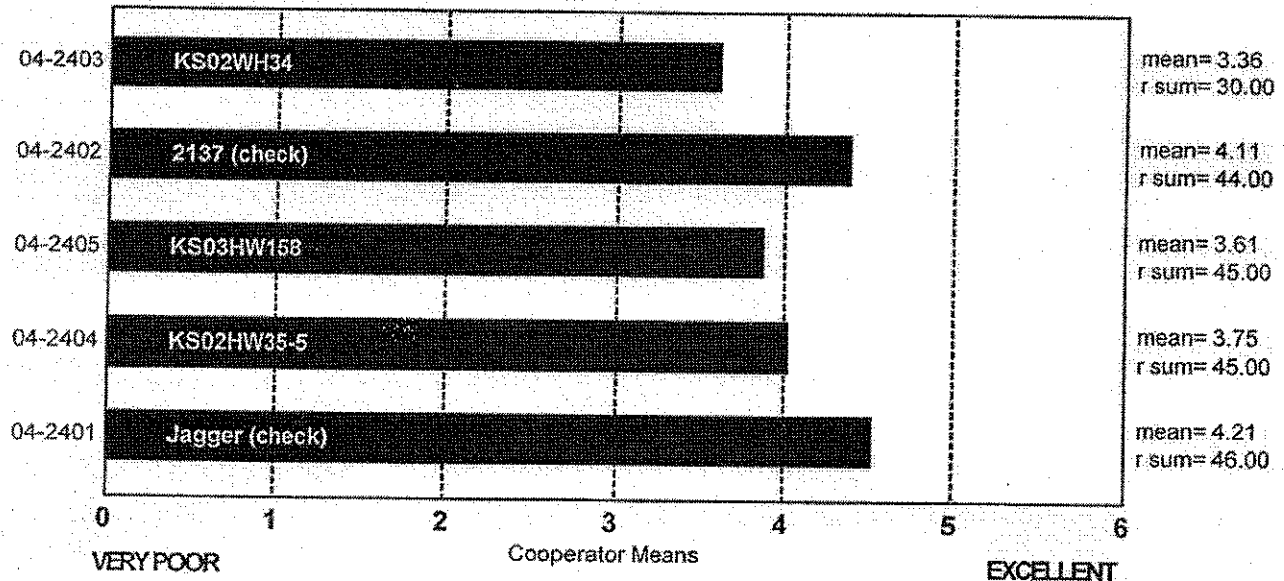
DOUGH CHAR. 'AT MAKE UP'

(Small Scale) Kansas-Hays

Variety order by rank sum.

No samples different at 5.0% level of significance.

ncoop= 14
 chisq= 5.20
 chisq= 6.17
 cvchisq= 9.49
 crdiff=



DOUGH CHAR. 'AT MAKE UP', DESCRIBED

(Small Scale) Kansas-Hays

	Sticky	Wet	Tough	Good	Excellent
04-2401 Jagger (check)	0	0	6	5	3
04-2402 2137 (check)	0	0	4	7	3
04-2403 KS02WH34	2	2	3	6	1
04-2404 KS02HW35-5	0	0	3	9	2
04-2405 KS03HW158	0	0	5	8	1

Frequency Table

356

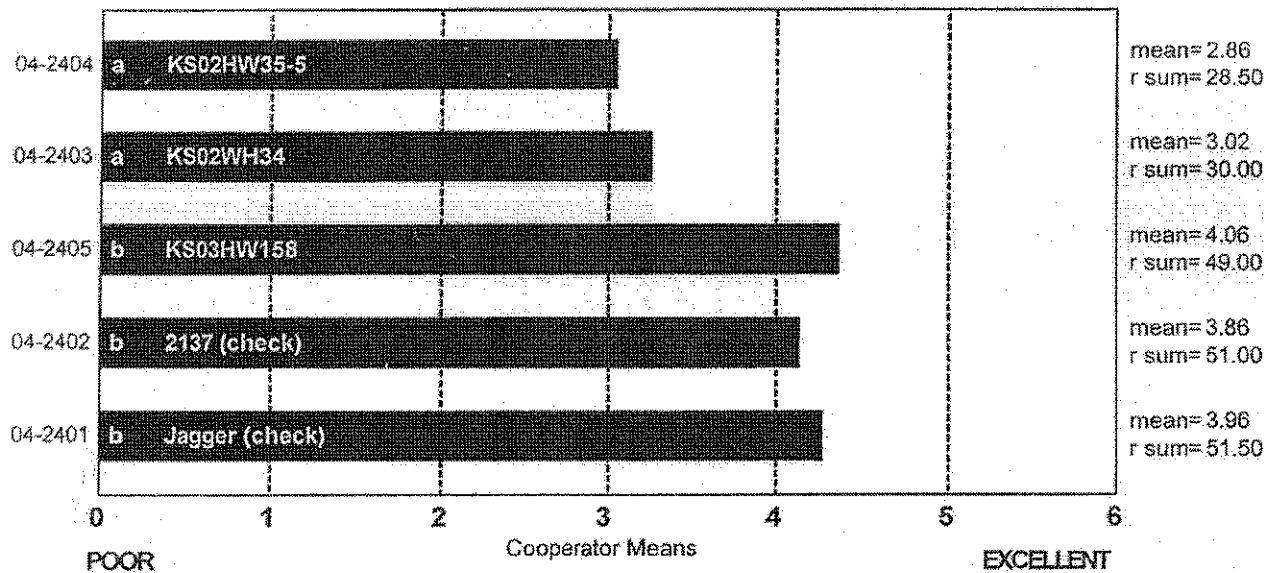
200700177

CRUMB GRAIN (Small Scale) Kansas-Hays

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop= 14
chisq= 15.61
chisqc= 17.28
cvchisq= 9.49
ordiff= 13.77



CRUMB GRAIN, DESCRIBED (Small Scale) Kansas-Hays

	Open	Fine	Dense
04-2401 Jagger (check)	7	7	0
04-2402 2137 (check)	2	10	2
04-2403 KS02WH34	10	3	0
04-2404 KS02HW35-5	9	4	0
04-2405 KS03HW158	6	6	1

Frequency Table

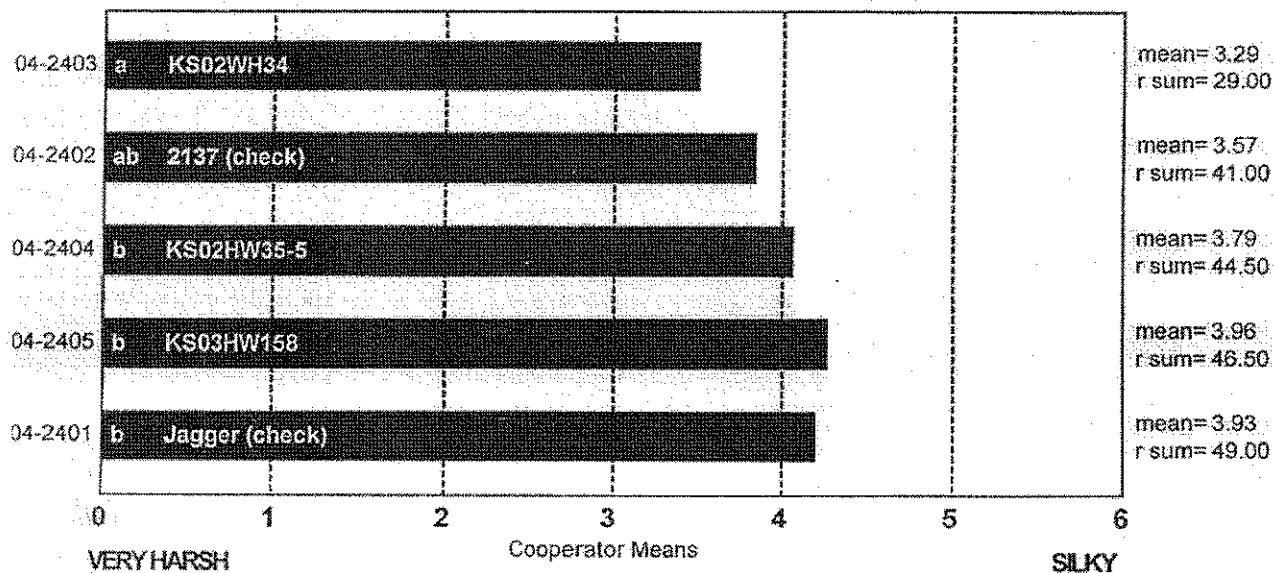
200700177

CRUMB TEXTURE (Small Scale) Kansas-Hays

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop=14
chisq=7.01
chisqc=9.53
cvchisq=9.49
crdiff=13.61



CRUMB TEXTURE, DESCRIBED (Small Scale) Kansas-Hays

	Harsh	Smooth	Silky
04-2401 Jagger (check)	1	10	3
04-2402 2137 (check)	4	7	3
04-2403 KS02WH34	6	7	1
04-2404 KS02HW35-5	5	5	4
04-2405 KS03HW158	2	9	3

Frequency Table

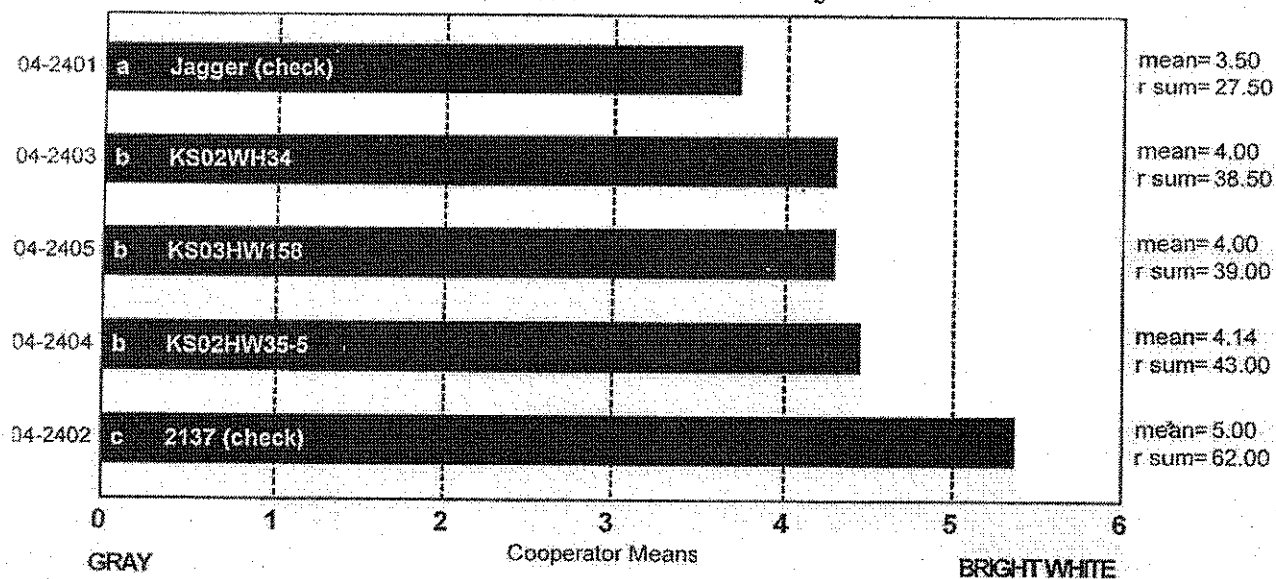
200700177

CRUMB COLOR (Small Scale) Kansas-Hays

Variety order by rank sum.

Samples with the same letter not different at 5.0% level of significance.

ncoop= 14
chisq= 18.07
chisqc= 25.69
cvchisq= 9.49
crdiff= 10.75



CRUMB COLOR, DESCRIBED (Small Scale) Kansas-Hays

	Gray	Yellow	Dull	Creamy	Bright White
04-2401 Jagger (check)	1	1	2	10	0
04-2402 2137 (check)	0	0	0	3	5
04-2403 KS02WH34	0	1	0	10	0
04-2404 KS02HW35-5	0	0	3	5	1
04-2405 KS03HW158	0	0	1	8	1

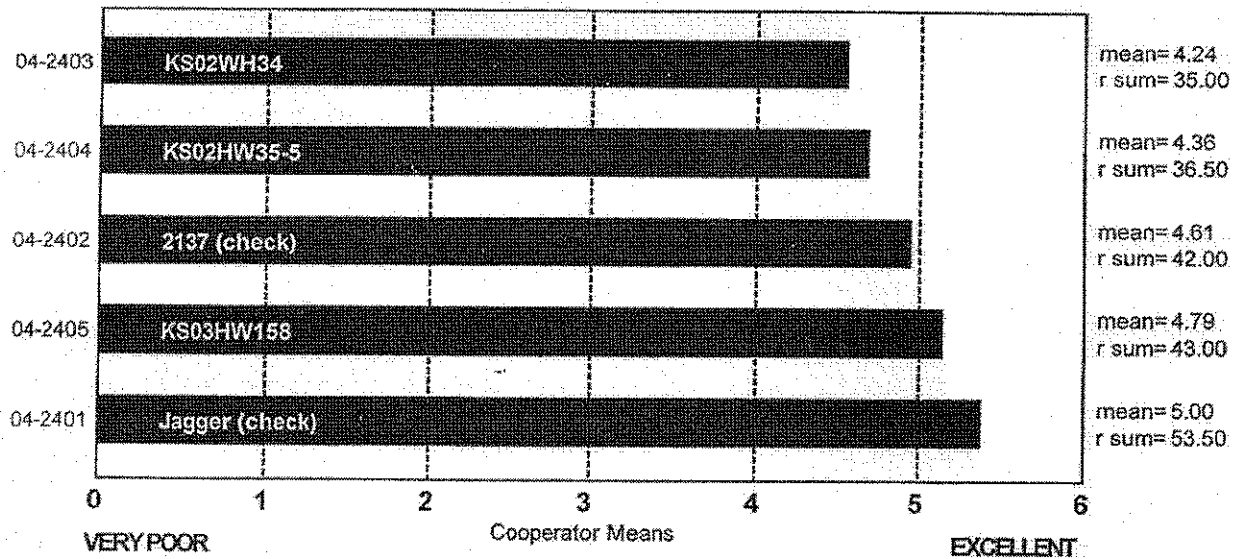
Frequency Table

200700177

LOAF VOLUME (Small Scale) Kansas-Hays

Variety order by rank sum.
No samples different at 5.0% level of significance.

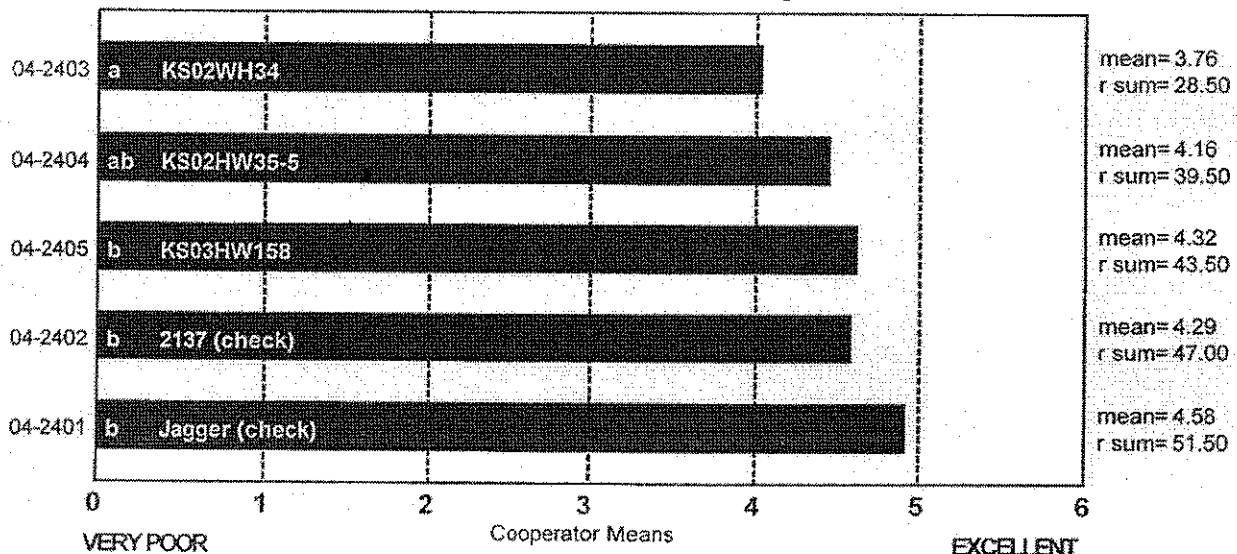
ncoop=14
chisq=6.07
chisqc=7.39
cvchisq=9.49
crdiff=



OVERALL BAKING QUALITY (Small Scale) Kansas-Hays

Variety order by rank sum.
Samples with the same letter not different at 5.0% level of significance.

ncoop=14
chisq=8.74
chisqc=10.83
cvchisq=9.49
crdiff=14.06



U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). The information is held confidential until the certificate is issued (7 U.S.C. 2426).

**EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP**

1. NAME OF APPLICANT(S) Kansas Agricultural Experiment Station	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER KS02HW34	3. VARIETY NAME Danby
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) Kansas State University Waters Hall Manhattan KS 66506	5. TELEPHONE (Include area code) 785.532.6147	6. FAX (Include area code) 785.532.6563
7. PVPO NUMBER #200700177		

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain. ☒ YES ☐ NO9. Is the applicant (individual or company) a U.S. national or a U.S. based company? If no, give name of country. ☐ YES ☐ NO10. Is the applicant the original owner? ☒ YES ☐ NO If no, please answer one of the following:

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

☐ YES ☐ NO If no, give name of country

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

☐ YES ☐ NO If no, give name of country

11. Additional explanation on ownership (Trace ownership from original breeder to current owner. Use the reverse for extra space if needed):

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 0.1 hour per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, D.C. 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

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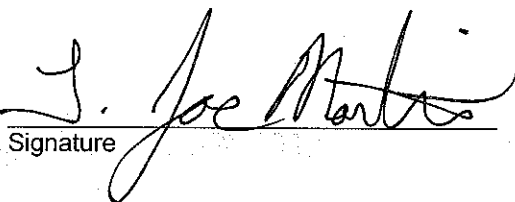
To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

EXHIBIT F
DECLARATION REGARDING DEPOSIT

NAME OF OWNER (S) Dr. Forrest Chumley	ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country) Kansas Agricultural Experiment Station Kansas State University 148 Waters Hall Manhattan, KS 66506-4008	TEMPORARY OR EXPERIMENTAL DESIGNATION KS02HW34 VARIETY NAME Danby
NAME OF OWNER REPRESENTATIVE (S) Dr. T. Joe Martin	ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country) KSU Ag Research Center-Hays 1232 240th Avenue Hays, KS 67601-9228	FOR OFFICIAL USE ONLY PVPO NUMBER #200700177

I do hereby declare that during the life of the certificate a viable sample of propagating material of the subject variety will be deposited, and replenished as needed periodically, in a public repository in the United States in accordance with the regulations established by the Plant Variety Protection Office.


Signature

3-2-07
Date